

**EXPLORING CONSUMERS' SUBCONSCIOUS  
RESPONSE ON MARKETING MIX TOWARDS  
GREEN AND NON-GREEN PRODUCTS:  
A NEUROMARKETING APPROACH**

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**UNIVERSITI SAINS MALAYSIA**

**2019**

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GREEN AND NON-GREEN PRODUCTS:  
A NEUROMARKETING APPROACH**

by

**AIDA AZLINA BINTI MANSOR**

**Thesis submitted in fulfilment of the requirements  
for the degree of  
Doctor of Philosophy**

**October 2019**

## ACKNOWLEDGEMENT



In the name of Allah, the Most Gracious and the Most Merciful. Alhamdulillah, all praises to Allah SWT for the strengths, blessing and greatness for giving me the strength and courage to complete this thesis. All praise and thanks are due to the Allah SWT who always guides me to the right path and has helped me to complete this thesis.

I would like to express my special and heartily thanks with sincere gratitude to my supervisor Associate Professor Dr. Salmi binti Mohd Isa for the continuous support of my Ph.D. study and related research, for her patience, motivation and great expertise. Her guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my Ph.D. study.

Besides my main supervisor, I would like to thank my co-supervisors; Dr. Mohammed Faruque Reza and Dr. Goh Yen Nee for their insightful comments and encouragement, also for the constructive feedback which helps me to widen my research from various perspectives. My sincere thanks also go to Prof. Dato' Dr. Jafri Malin bin Abdullah and Dr. Tahamina Begum who provided me guidance and gave me access to the laboratory and research facilities. Without their precious support, it would not be possible to conduct this research.

Last but not the least; my acknowledgement would be incomplete without thanking the biggest source of my strength, my family. Nobody has been more important to me in the pursuit of this dream than my beloved and supporting husband Syaharudin Shah bin Mohd Noor, my parents Hj Mansor bin Omar and Hj Che Maznah binti Abdullah; and my wonderful daughters; Adriny Fatryshah and Adriana Qalyshah for supporting, encouraged and prayed for me throughout my journey. This thesis is a tribute to their unconditional love and never ending encouragement for supporting me spiritually throughout writing this thesis.

Alhamdulillah for everything I have, Alhamdulillah for everything I had and Alhamdulillah for everything I will have.



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## LIST OF ABBREVIATION

4Ps	Product, Price, Promotion And Place
AOI	Area of Interest
C	Central
EEG	Electroencephalography
ERP	Event Related Potential
F	Frontal
FMCG	Fast-Moving Consumers Goods
fMRI	Functional Magnetic Resonance Imaging
GSR	Galvanic Skin Response
HUSM	Hospital Universiti Sains Malaysia
JEPeM	Jawatankuasa Etika Penyelidikan (Manusia)
MEG	Magneto Encephalography
ms	Latency
O	Occipital
P	Parietal
PET	Positron Emission Tomography
SMI	SensoMotoric Instruments
T	Temporal
USM	Universiti Sains Malaysia
$\mu$ V	Amplitude

## LIST OF TERMINOLOGIES

Amplitude	The maximum extent of a vibration or oscillation, measured from the position of equilibrium
Area of Interest	Areas within a page and to compare eye tracking data by eye tracking data for areas such as fixation count and fixation duration
Brain waves	Synchronised electrical pulses from masses of neurons communicating with each other
Channels	A band of frequencies used
Conscious	Aware of and responding to one's surroundings
Consent form	A form signed by a patient prior to a medical procedure to confirm that he or she agrees to the procedure and is aware of any risks that might be involved
Electrical signals	Voltage or current which conveys information
Electrodes	A conductor through which electricity enters or leaves an object, substance, or region
Electroencephalograms	Tools for capturing brain signals throughout the scalp
Eye tracking	To study the visual inspection of goods and services
Fixation	The action of concentrating the eyes directly on something
Gaze	A steady intent look
Impedance	The effective resistance of an electric circuit or component to alternating current



Latency	Time of processing of information by the consumers
Lobes	Parts of the cerebrum of the brain
Nervous system	Part of an body that coordinates its actions by transmitting signals to and from different parts of its body
Neuroscience	Scientific study of the nervous system
Non-invasive	Not tending to spread undesirably or harmfully
Oddball paradigm	Experimental design used within psychology research
P300	Main components of brainwaves, a basis in decision making
Pupil	The dark circular opening in the centre of the iris of the eye
Saccade	A rapid movement of the eye between fixation points
Scalp	The skin covering the head
Stimuli	Something that incites to action or exertion or quickens action, feeling, thought
Subconscious	Part of the mind of which one is not fully aware but which influences one's actions and feelings
Temporal resolution	The precision of a measurement with respect to time

**MENEROKA TINDAK BALAS MINDA BAWAH SEDAR PENGGUNA  
TERHADAP PEMASARAN CAMPURAN KE ATAS PRODUK HIJAU DAN  
PRODUK BUKAN HIJAU: PENDEKATAN *NEUROMARKETING***

**ABSTRAK**

Pemasaran adalah teras bagi sesebuah perniagaan dan matlamat utamanya adalah untuk membawa produk ke pasaran sasaran. Ciri-ciri utama produk tradisional seperti Produk, Harga, Promosi dan Lokasi adalah ciri yang paling penting apabila pengguna membuat keputusan dalam pembelian. Walau bagaimanapun, salah satu punca utama kegagalan dalam strategi pemasaran adalah kerana tidak memahami proses membuat keputusan yang berlaku dalam minda bawah sedar pengguna. Oleh itu, pakar pemasaran telah mensia-siakan sebahagian daripada peruntukan pemasaran mereka dengan hanya menarik perhatian 10% daripada fungsi otak pengguna semasa membuat keputusan. Oleh itu, kaedah yang sesuai adalah amat penting bagi pakar pemasaran untuk memahami tindak balas asas minda bawah sedar pengguna semasa membuat keputusan. Dalam beberapa dekad yang lalu, kemajuan signifikan bidang neurosains telah melahirkan kaedah *neuromarketing* yang memberikan pemahaman yang lebih mendalam bagaimana cara otak bertindak balas dalam situasi harian, khususnya dalam aktiviti pemasaran. Konsep terbaru ini memberi pandangan yang berkesan dan teknik terbaik dalam penyelidikan pemasaran terutamanya analisis tentang pengguna. Oleh itu, kajian ini bertujuan meneliti bidang "*neuromarketing*" yang semakin maju dan meneroka minda bawah sedar pengguna dengan mengkaji keberkesanan fungsi pemasaran ke atas proses membuat keputusan. Kajian ini menggunakan *Electroencephalograms (EEG)* dan *Eye Tracker* untuk mengenalpasti tindak balas minda bawah sedar pengguna terhadap komponen utama pemasaran

dalam proses membuat keputusan. Seramai tiga puluh satu sukarelawan telah mengambil bahagian dalam kajian ini yang menggunakan eksperimen di dalam makmal. Hasil kajian menunjukkan Harga dan Imej Produk bagi produk bukan hijau menerima lebih banyak maklum balas berbanding dengan produk hijau semasa aktiviti berlaku di minda bawah sedar pengguna. Ini adalah perkara utama yang diambil kira oleh pengguna semasa membuat keputusan. Walau bagaimanapun, strategi pemasaran tidak akan berfungsi jika perkara tersebut tidak disampaikan dengan baik. Tujuan utama menggunakan kaedah *neuromarketing* adalah bukan untuk menggantikan kaedah pemasaran tradisional sedia ada, tetapi untuk menyumbang maklumat yang unik dan lengkap kepada bidang pengetahuan tersebut. Oleh itu, *neuromarketing* dapat mengesahkan, menyusun semula dan menambahbaik teori pemasaran konvensional yang sedia ada. Dapatan ini menawarkan peluang baru bagi pemasar untuk menambah baik strategi pemasaran mereka dalam meningkatkan pertumbuhan jualan.

**EXPLORING CONSUMERS' SUBCONSCIOUS RESPONSE ON  
MARKETING MIX TOWARDS GREEN AND NON-GREEN PRODUCTS:  
A NEUROMARKETING APPROACH**

**ABSTRACT**

Marketing is the core of a business and the primary goal of marketing is to bring the products to the target market. Traditional products characteristics such as Product, Price, Promotion and Place are the most important attributes when consumers consider when making a purchase decision. However, one of the main reasons of some marketing strategy fail is because the inability to understand the decision making process that takes place in consumers' subconscious minds. Thus, marketers waste most of their budget by attracting only 10% of the brain that drives consumers' decisions. For that reason, a suitable method is therefore essential for marketers to understand the underlying responses when consumers make decision. Due to the issue, in the last few decades, significant advancement of neuroscience has resulted in the emergence of neuromarketing, which provides a better understanding of how subconscious minds reacts in everyday situations, especially in marketing activities. This new concept brings powerful insights and techniques into marketing research especially on consumers' behaviour analysis. In this view, this study looks at the growing field of neuromarketing and aims to explore consumers' subconscious minds by examining the effectiveness of marketing mix on consumers' decision making process. This study employed Electroencephalograms (EEG) and Eye Trackers to examine consumers' subconscious minds towards the main component of the marketing mix during the decision making process. A laboratory experiment employed thirty-one volunteers to take part in the study. The results

revealed that Price and Product Image of non-green products received more responses compared to green products in consumers' subconscious minds. These are the key attributes which consumers consider in decision making. However, marketing strategy will not work if those attributes are not well communicated. The main motivation of employing neuromarketing is not to replace traditional marketing methods, but rather to provide unique and complementary insights into the body of knowledge. Thus, neuromarketing is able to confirm, reconfigure, and improve conventional theories of marketing. This evidence offers a new marketing opportunity for marketers to improvise their marketing strategy and thus increase their sales growth.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of the study

Neuromarketing are emerging interdisciplinary fields at the interface between neuroscience, psychology, and marketing. These new concepts provide a powerful understanding and technical approach into marketing research especially on consumers' analysis. The concept of neuromarketing has been the reason of new research in marketing as evidence from Google Trends (2019), interest in applying neuroscientific findings and methodologies to marketing disciplines has been increasing.

It is necessary to have an idea that it is the core concept of neuromarketing comprises of three (3) main disciplines which are, neuroscience, marketing and psychology and these disciplines explore consumers response for decision making process in a meaningful way (Smidts, 2013; Javor, Koller, Lee, Chamberlain, & Ransmayr, 2013; Khushaba, Wise, Kodagoda, Louviere, Kahn & Townsend, 2013; Genco, Pohlmann, & Steidl, 2013; and Sebastian, 2014). Neuromarketing is also known as consumers neuroscience; the application of neuroscience to consumers and in market research. Figure 1.1 illustrates the collaboration between three main areas of neuromarketing.

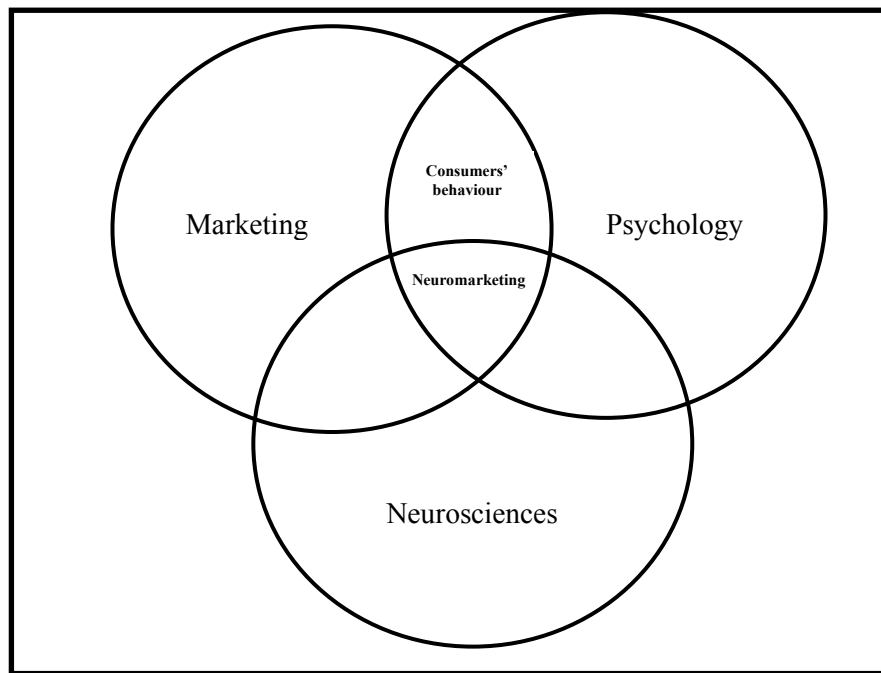


Figure 1.1 Basic areas in neuromarketing

*Source: Illustrated by the author*

The combination of the three areas represents the term neuromarketing. Figure 1.1 explains that the inter-relation between marketing and psychology that leads to consumers' behaviour, which involves a complicated mental process in decision making. In the direction to obtain an in-depth understanding and knowledge of decision making process, neuroscience is embedded between the two areas. Neuromarketing enables marketers and researchers to understand the reactions of consumers and to ascertain the strength of their reactions without openly asking the consumers for their opinion (Bosshard, 2016). It is a new research method that aims to investigate more than traditional research methods can offer.

As traditional research methods, techniques and tools have continuously developed, neuromarketing methods and techniques have added depth and accuracy to the traditional studies (Pop, Dabija, & Iorga, 2014). In addition, Vecchiato, Toppi, Astolfi (2011) explained the main reason why marketing researchers are interested to use neuroimaging tools instead of using simple questions and answers about consumers' preferences is that it can gain a multi-faceted understanding of the consumers. Moreover, neuroscience tools also reveal information on consumers' preferences that are unobtainable through conventional or traditional research method (Ariely & Berns, 2010). Thus, neuromarketing provides a chance to experience a wider range of behavioural information from the subconscious mind that guides individuals in their decision making process of which is not obtainable by traditional marketing methods (Hubert & Kenning, 2008; Tusche, Bode, & Haynes, 2010; Ariely, & Berns, 2010; Senior, & Lee, 2008; Roth, 2013; and Colaferro & Crescitelli, 2014). Subconscious mind is a mental process of consumers operating outside of consumers' awareness (Goode, 2008). According to Connell et al. (2011), the subconscious processes 200,000 times more information than the conscious mind and processes emotions about 10 times faster than the conscious mind. In detail, Zurawicki (2010), mentioned the subconscious mind takes care of all the vital processes of our body, of things people have learned and recorded, even if unaware of it.

The main concept of neuromarketing is totally related with the brain activities, understanding consumers' subconscious mind, explaining consumers' preferences, motivations and expectations, and predicting consumers behaviour (Bercea, 2011; Dapkevičius & Melnikas, 2009; Colaferro & Crescitelli, 2014; Fugate



2007). Thus, neuromarketing approach is able to quantify, explain and acquire the hidden subconscious response, which provides a wide range of knowledge, gathering from behavioural information and the hidden motivation in the subconscious mind that guide consumers in their decision making process (Barkin, 2013; Colaferro & Crescitelli, 2014 and Mehta & Panda, 2015). The application of neuromarketing can be used both by businesses and academicians depending on the objectives of the investigation. Neuromarketing techniques are therefore a perfect opportunity to further study the concept of marketing (Kenning, Plassmann, & Ahlert, 2007).

The term neuromarketing was first introduced in 2002 by Professor Ale Smidts of Erasmus University in Rotterdam as a reference to the application of neuroimaging techniques in marketing research. Smidts (2013) in his unpublished work, explained how neuroscience tools such as Functional Magnetic Resonance Imaging (fMRI) scanner is used to measure consumers' subconscious processes such as emotions, needs and wants, to stimuli, such as pictures and sound. However, another findings found that the first use of fMRI as a marketing tool was reported by Gerry Zaltman of Harvard towards the end of 1990's (Lewis & Bridger, 2004).

Neuroscience concept is not a new motion in marketing. It was originated in 1884, where neuroscience appeared in the experiment conducted by Italian psychologist, Angelo Mosso (Ciprian-Marcel, Lăcrămioara, Ioana & Maria, 2009). In the manuscript, the experiment was illustrated as 'human circulation balance' (Field & Inman, 2014). Figure 1.2 illustrates the experiment, where it analysed a subject lying on a balancing table which could be inclined if the feet or the head became heavier; when the subject encountered with emotional activity, then the

balance would incline towards the head as a result of the blood redistribution into the body (Ciprian-Marcel et al., 2009). This yet simple significant experiment only confirmed the existence of neuroscience; a concept inevitable in the marketing segment and business orientation.

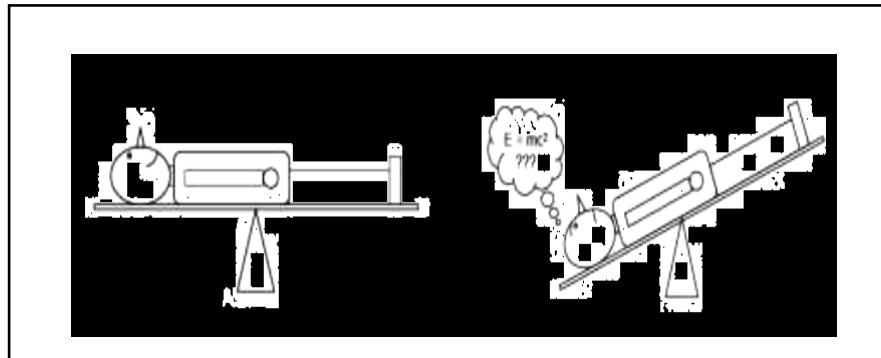


Figure 1.2 The Angelo Mosso Experiment

*Source : Ciprian-Marcel et al., (2009)*

The term neuromarketing originally appeared to be used by Bright House, an advertising company, using Functional Magnetic Resonance Imaging (fMRI) for marketing research (Fisher, Chin, & Klitzman, 2010). In essence, neuromarketing tools were made available since the early 1960's when Herbert Krugman started to use pupil meter tools that measure spontaneous pupil enlargement as an indicator of consumers' interest while looking at packages or print advertisements and Galvanic Skin Response (GSR) as a signal of consumers' emotional response to advertisements (Sutherland, 2007).

There is a growing number of neuromarketing definitions mentioned by scholars. For this study, neuromarketing is fundamentally defined as the application of neuroscience tools to better understand consumers' behaviour and to investigate the effectiveness of the marketing functions based on consumers' reaction and

response resulting from marketing stimulation. Neuromarketing asserts that the application of neuroscientific tools and marketing application is important to ensure the meaning of the concept (Lee et al., 2007). Therefore, from the perspective of this research, neuromarketing is a discovery of neuroscientific methods and marketing strategy in order to better understand consumers' subconscious responses and to investigate the effectiveness of the marketing functions in order to reduce product failures as well as to increase profits. However, it should be noted that the idea of neuromarketing is not to replace the traditional marketing methods, rather to provide unique and complementary insights (Georges, Bayle-Tourtoulau & Badoc, 2014). In his study, Steidl (2012) agreed that the foundation of neuromarketing will allow marketers to gain deeper understanding on the operation of the consumers' minds.

The neuromarketing method is applicable to explain the mystery of a consumers' subconscious response and to explore the power of marketing by observing and analysing the consumers' responses towards the simulation. In the literature search for this study, the terms 'neuromarketing' and 'consumers neuroscience' were used interchangeably; thus, the early publications of neuromarketing can be traced back to 2007. Figure 1.3 as revealed by Lee, Chamberlain, & Brandes (2018) shows that the visibility of publications in the field of neuromarketing, both conceptual and empirical articles over the past ten years is on the rise.

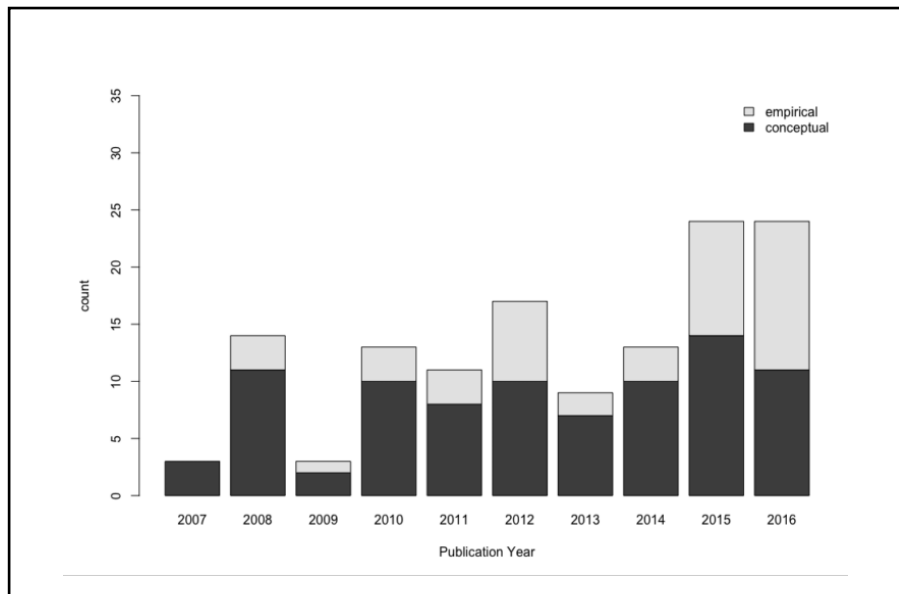


Figure 1.3 Number of neuromarketing publications from 2007-2016  
*Source : Lee, Chamberlain, & Brandes (2018)*

There is also a growing body of literature that recognises the importance of neuromarketing and the interest on the topic of neuromarketing over time from Google search (Google Trends, 2019). Figure 1.4 illustrates the trend of neuromarketing topics searched from all over the world over the past 15 years (2004-2019). As the subject of neuromarketing continues to grow for the past 12 years and drop for the past three years. There is clear trend of decreasing of neuromarketing search between 2017 to 2019. This situation happen maybe because of steep expenses is one of the primary obstacles in studies into neuromarketing (Slijepčević, Sević, & Radojević 2019). However, the search of neuromarketing it is believed becoming increasingly important in delivering meaningful data to the marketing industry.

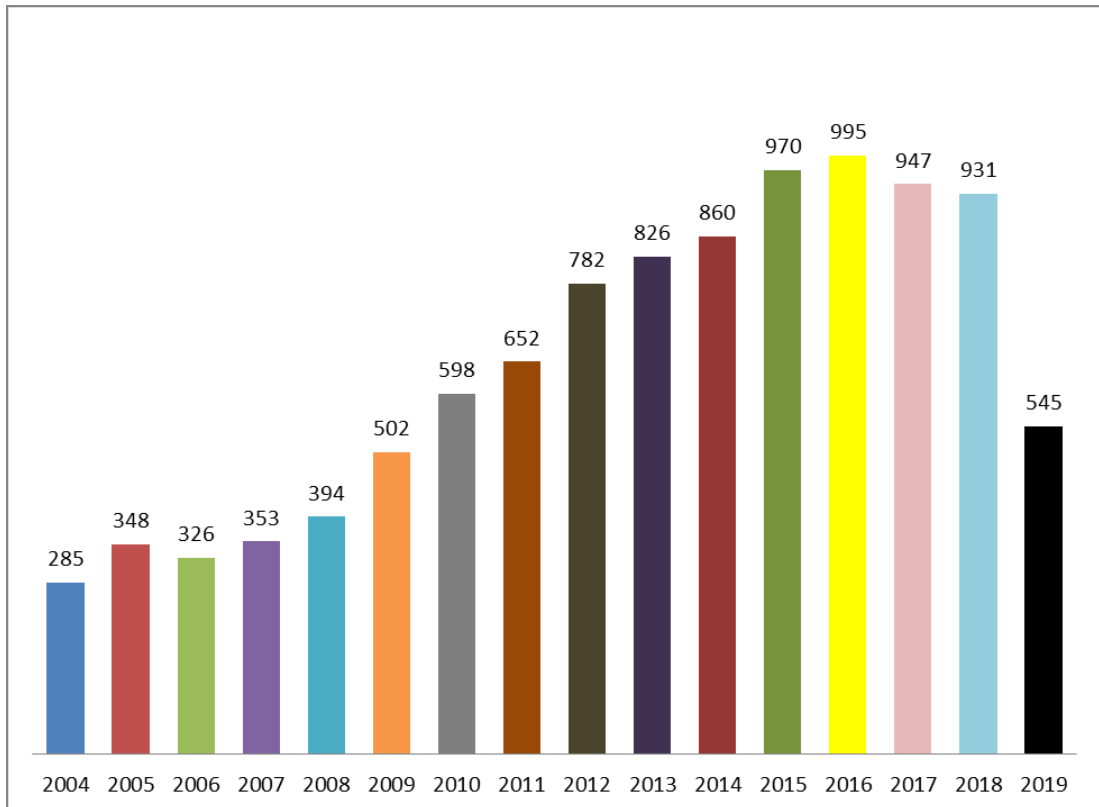


Figure 1.4 Neuromarketing interest from 2009 – 2019

*Source: Google Trends (2019)*

Consumers’ responses are measured by capturing activity from the brain and body from neuromarketing perspectives. Neuromarketing tools such as Functional Magnetic Resonance Imaging (fMRI), Electroencephalography (EEG) and eye tracking are capable of analysing consumers’ decision making process in detail (Zurawicki, 2011; and Roth, 2013). This is due to the fact that neuromarketing is able to analyse the decision making process by understanding the processes that are taking place in consumers’ brain during all steps in the buying process, especially in learning more about the needs and wants of consumers (Kolar, 2014). It will provide insights on how consumers perceive stimuli coming from marketing messages such as the 4Ps, and on how the subconscious part of the brain interprets and influences

the decision making processes (Hesis, Arlauskaitė, & Sferle, 2013). It is predicted that through neuromarketing approach, consumers' thoughts can be extracted and as a result, marketers can construct both valuable products and services that meet their needs or consumption.

Looking at myriad of issues in the marketing field in the 21<sup>st</sup> century, the growth of green products caught attention primarily from both consumers and companies. They have become more concerned with the environment and are realising that the production and purchase behaviour will have a direct impact upon the environment. Green products according to Pechyiam & Jaroenwanit (2014) are non-toxic products made from recycled materials and use minimal materials in packaging. While to Khare et al. (2013) mentioned green products should highlight how the products will give positive impact to the environment without using a harmful ingredients. Example of green products such as green car, where it is an energy-efficient automobile which produce limited air pollution. Organic foods also are the obvious example of green products. The main concept in designing the green products; is the products that are less harmful towards the environment. Ottman, Stafford, & Hartman (2006), suggested green product would include the following five kinds of perceived value: efficiency and cost effectiveness, health and safety, performance, symbolic and status, convenient. When these characteristics of green products are successfully communicated the consumer, it may arouse consumer emotions, such as protective feelings toward the environment (Lin & Huang, 2012).

Therefore, consumers support and purchase green products to make sure their contribution to support and to sustain the environment, and companies express their environmental sensitivity with different marketing strategies. As consumers are becoming more and more concern about the environment, marketers have begun to change how they produce their products and implement new marketing strategy. As a result, marketer has begun to structure their marketing systems to get the attention from green consumer. Thus it is the trend nowadays for marketers to adopt the concept of green marketing in order to support consumer green purchase behaviour. Green marketing tools are considered as enhancements to consumers' knowledge about green products

For example, the rapid growth of green consumers' products caught the attention of both consumers and consumers' goods producers. The decisions made by the consumers to purchase green consumers goods are mainly because of trust and they feel safe with the brand and most importantly, the brand produces consistently good quality green products as promised. In general, consumers support the green products because they want to contribute in supporting a sustainable environment. Therefore, the products' attributes play an important role because they influence consumers' green purchase behaviour and help companies to satisfy consumers' needs, wants and demands on green products. Green purchase behaviour is the behaviour among green customers seeking a product that is environmentally friendly and does not damage either themselves or mostly the environment.

However, the process of buying green products is still difficult to understand and because few issues have arisen which are related to the consumers behaviour. In most cases, consumers always express their concern for the environment, but their attitudes are not always translated into their purchasing behaviour (Kaufmann, Panni, & Orphanidou, 2012; Do Paço, Alves, Shiel, & Filho, 2013). This can be seen where Gan et al. (2008) mentioned that not all consumers are prepared to pay a high price for green products. Other factors such as lack of availability, higher perceived prices and improper communication about green products are recognised as the main barriers responsible for the purchasing green products (Barbarossa & Pastore, 2015).

The local scenario on green products purchase and consumption appeared to be similar with other developed nations. A study conducted by The Nielsen Global Survey (2015) stated that 65% of Malaysian consumers said to have purchased green products made by a brand or company they trust. In another study conducted by Nik Abdul Rashid (2009), showed that in Malaysia, the awareness of eco-label has positive effect between knowledge of green product and consumers' intention to purchase. In retrospect, Abdul Wahid et al. (2011) found that the practice of purchasing green products is still low in Malaysia and consumers' perceptions regarding environmentally friendly products are not enhanced compared to conventional products. This is supported by Do Paço, Alves, Shiel, & Filho (2013), who mentioned that even though consumers express a real concern for the environment, their attitudes are not always translated into their purchasing behaviour. Therefore, it is crucial to recognise consumers' decision making behaviour from another perspective, which is from consumers' subconscious mind.



Subconscious is defined as “mental processes that are inaccessible to consciousness but influence judgments, feelings, or behaviour (Poldervaart, 2009). Consequently, the assessment of consumers response to marketing strategy must be understood at the subconscious level, as subconscious response is an important signal of consumers’ response to marketing activities. (Connell et al., 2011; Sutherland, 2007 & Agarwal & Dutta, 2015). Understanding consumers’ behaviours processes and influences towards the marketing mix used for a product is crucial (Burnett, 2008). These are the reasons why consumers’ decision making cannot be understood simply by studying their final decisions (Chae & Lee, 2013). The core process in-between the final decision is crucial in order to have a better understanding on the consumers. Therefore, it is essential for marketers to learn consumers’ decision making process in order to reduce product failures and increase consumers loyalty as well as profits (Goode, 2008; and Mehta & Panda, 2015).

In order to understand how subconscious minds work, exploring consumers’ brain and activity helps to understand the concept behind the decision making process. For the purpose of this study, Electroencephalography (EEG) and eye tracker are well-established and non-invasive methods used for measuring and mapping consumers’ brain responses on marketing mix messages. EEG is the tool for recording the electrical signals of the brain over the whole scalp (Subbulakshmi, Balaganapathy, & Gerard, 2014), and the role of EEG is to measure mental responses in decision making process (Morin, 2011; Khushaba et al., 2013). This is because brain stimuli are the central concepts to understand what motivates consumers to make the buying decision (Kumar & Singh, 2016). Therefore, “a rising number of marketers now prefer to analyse the response of peoples’ brain waves by using the

latest developments in neuroscience” (Babu & Vidyasagar, 2012, p90). Thus, by measuring the brainwaves, it may reveal consumers’ subconscious responses to marketing stimuli (Ariely & Berns, 2010; Kenning & Linzmajer, 2011; Morin, 2011; and Yadava, Kumar, Saini, Roy, & Dogra, 2017).

Another popular method of neuromarketing tool is eye tracking which tracks the movements of the pupil towards the form of visual marketing messages. The application of eye tracking technique could also provide valuable insights into users’ behaviour (Adnan, Hassan, Abdullah, & Taslim, 2013). In addition according to Zurawicki (2010), eye tracking is a useful technique for the analysis of behaviour and cognition. Roth (2013) also mentioned that eye tracking method provides information about brain activity where it can track what consumers actually see and to which items they pay attention. Eye tracking measures pupil dilation, eye movement and gaze point in order to measure consumers behaviour such as interest, attention and attraction (Samsuri, Begum, Reza, Omar, Yusoff, Idris & Isa, 2016). Furthermore, the results from eye tracking provide more accurate information than self-report (Connell, Walden & Pohlmann, 2011). Therefore, based on the advice by Roth (2013), Simson (2010) and Bercea (2012), a combination of EEG and eye tracking are an effective method which can measure brain activities more specifically through available technology in neuroscience in order to understand the effects of marketing stimulation on consumers.

As mentioned earlier in the study, neuromarketing is all about understanding consumers’ decision making (Solnais, Andreu-Perez, Sánchez-Fernández, & Andréu-Abela, 2013; Sahu, Pune, & Singh, 2002; Plassmann et al., 2015; Sebastian, 2014;

Fugate, 2007; Dapkevičius & Melnikas, 2009; Grbac & Vujičić, 2014; Lee et al., 2007; Genco et al., 2013; Telci, Maden, & Kantur, 2011; Ariely & Berns, 2010; Plassmann, Ramsøy, & Milosavljevic, 2012; Venkatraman, Clithero, Fitzsimons, & Huettel, 2012; and Roth, 2013). It can be summarized that neuromarketing is a new areas in marketing and emerging research area that needs to be explored.

Thus, the main issues addressed in this study are to ascertain unique and complementary insights of neuromarketing towards traditional marketing methods of assessing consumers' decision making between green and non-green products. The concept of neuromarketing is the main motivation for this study and it intends to close the existing gap whereby traditional marketing research is unable thoroughly and vigorously explore consumers' subconscious minds during purchase decision.

## **1.2 Problem statement**

In recent years, marketing researchers have drawn attention to green purchasing behaviour. Consumers are increasingly concerned about the deterioration of the environment and willing to buy green products. Thus, companies increasingly apply 'green' concept in their business to capture consumers' attention and create consumer towards a more environmentally friendly behaviour. It is important for every company to pay more attention on the packaging, labelling and price to deliver good and quality green products. The decision making process in selecting green products may last only seconds, but the complex brain functions that trigger this procedure is still largely unknown (Bello, 2014). This is mainly driven by the fact

that, consumers themselves do not know exactly what influences purchase behaviour of the products.

Due to the issue, NeuroSense (2015) reported that 80% of all new products fail within the first year of launching due to the failure in understanding the decision making process that take place in the subconscious minds of the consumers. According to Neto, Filipe, & Ramalheiro (2011), Murphy (2005), Poldervaart (2009), Zurawicki (2010), Zaltman (2003) and Brierley (2017), 85% to 95% of consumers' decision making are made subconsciously. Thus, the subconscious minds is a key player in consumers' decision making process. If companies know more about consumers' subconscious needs and desires, their products or services can better assist to serve to meet these needs and desires (Lindstrom, 2008). Mehta & Panda (2015) prove that the subconscious mind is equally important to a consumers' behavioural preference in purchase decision making.

One of the challenges for companies is to analyse the consumers' subconscious mind since the consumers' decision making process occurs in the subconscious mind (Lindridge, Wang, Butler, & Butler, 2008; Fugate, 2008; Hubert & Kenning, 2008; Morin, 2011; and Page, 2012). This is because some information is hidden deep in the subconscious mind of the consumers (Mandlik & Marathe, 2015). However, Morin (2011), Fugate (2008), Hart (2009), and Wilson, Gaines, & Hill (2008) found a limited study with regard to an interactive, comprehensive model that explains consumers' subconscious response and its impact on decision making.

Many companies experienced problems in identifying the subconscious mind of consumers' behaviour (Genco et al., 2013). Thus, one of the challenges for marketers is to analyse the consumers' "subconscious minds" (Butler, 2008; Fugate, 2008; Hubert & Kenning, 2008; Morin, 2011; Page, 2012). This is due to the fact that consumers have difficulties in stating their inner feelings and thoughts, and those data are difficult to analyse. Lindstrom (2008) mentioned that consumers' simply cannot express what they really think subconsciously. This is because neuroscience studies have shown that most purchase decisions are made by the consumers' subconscious minds, whereas responses to survey questions or a focus group are driven by the conscious mind (Steidl, 2012).

Therefore, there is a need for an investigation on how the neuromarketing approach will assist the marketing managers and researchers to understand consumers' decision making process from subconscious perspectives in order to produce effective marketing strategy. Evaluating consumers' decision making process must be understood at the subconscious level (Connell, Walden, & Pohlmann, 2011 & Härtel & Russell-Bennett, 2010). Processing of information at the subconscious level performs a great role in consumers' decision making (Agarwal & Dutta, 2015). Thus, there is a potential to discover a consumers' subconscious processes which will determine the consumers' decision making process and it will then reveal the hidden information about the consumers' behaviour, which are not obtainable by traditional marketing methods (Hubert, & Kenning, 2008; Ariely & Berns, 2010; Senior & Lee, 2008; Roth, 2013; and Colaferro & Crescitelli, 2014).

### **1.3 Gap**

Pop et al. (2014), it was asserted that by getting into the consumers' subconscious minds, the consumers' direct reactions to the stimuli such as products, packages, logos, visual, or auditory elements illustrating the products meet the consumers' needs will be ascertained. A variety of techniques and methods have been used to understand consumers' purchase decisions towards the products they choose. For decades, marketers rely on traditional research methods such as conventional self-report surveys, experiments and focus groups to measure the wants, needs and attitudes of consumers in order to get to know consumers effectively and to better understand the consumers' response (McDowell & Dick, 2013). The purpose of those traditional marketing methods is to understand consumers and draw conclusions on consumers' response and use the information to make marketing decisions for building a better brand. This is supported by Lee, Broderick, & Chamberlain (2007), who all agreed that traditional marketing research measures the ability and willingness of the consumers to report their attitudes or previous behaviours. Zurawicki (2010) also noted that traditional marketing research focuses on consumers' attitudes and preferences, determinants of choice and purchase, post purchase behaviour and loyalty.

Undeniably, this method has produced good results and helped the marketers to plan their strategic marketing planning. However, one of the major weaknesses of the traditional market research tool is its dependence on the respondents to provide honest feedback and the inability of their findings to observe the hidden part of the consumers' subconscious responses (Fugate, 2007). According to Haytko &

Matulich (2008), this is due to the fact that marketers and researchers have very limited tools to explore consumers' attitudes, intentions and behaviours in detail. If marketers want to obtain accurate feedback on a product they must get inside the consumers' minds (Ciprian-Marcel et al., 2009). Therefore, marketers have to reduce dependencies on traditional marketing strategies in order to gain accurate feedback from the consumers (Hammou, Galib, & Melloul, 2013).

It is challenging to gather a consumers' subconscious information using traditional research methods (Kolar, 2014). The drawback of this traditional marketing method is failing to focus on the consumers' subconscious minds (Calvert & Brammer, 2012 and Spanjaard, Young, & Freeman, 2014) and it leads to poor prediction of consumers behaviour. For that reason, Lowenstein (2014) stated that it is very important to know what is inside the consumers' minds so that marketers can shape, modify and communicate the messages to the consumers successfully.

In order to close the gap, researchers are applying neuroscience technology in marketing research to study consumers' subconscious response in detail. With the help of neuroscience, it is imperative to have some knowledge of the consumers' subconscious minds, which may appropriately assist the marketers to adjust and improve their marketing strategies (Hubert, 2010; and McDowell & Dick, 2013). The combination between neuroscience and marketing created the term neuromarketing and this relatively new field helps to understand the consumers' purchase behaviour better than traditional market research (Ciprian-Marcel et al., 2009). For that reason, neuroscientific technologies can support businesses in consumers' decisions on product placement and contributes in optimizing the traditional marketing mix

instruments such as product, price, communication, and distribution policies as well as brand research (Kenning & Linzmajer, 2011).

The subconscious response is too challenging to be discovered because researchers and marketers would require more advanced tools to get to know the consumers better. Thus, many marketers have problems in identifying the subconscious minds of a consumers (Genco et al., 2013) because the consumers' brain tells something different (Ciprian-Marcel et al., 2009). An appropriate method is vital for marketers to understand the underlying responses when consumers make decisions. Hence, many authors have called for further research into the subconscious response of consumers in decision making process (Hartmann & Ibanez, 2006).

Based on all the literature reviewed, almost all studies on neuromarketing (Flores, Baruca, & Saldivar, 2014; Hammou, Galib, & Melloul, 2013; Ozdemir, 2012; Vecchiato, Cherubino, Trettel, & Babiloni, 2013; Booth & Freeman, 2014) were carried out in western countries. Obviously, the non-western evidence and perspectives on neuromarketing is lacking. Generally in Asia, the application of neuromarketing concept is still in the initial stage. However, in some Asian countries, the application of neuromarketing is evolving into the advanced stage. It is expected, Asia will become the centre of gravity for big consumers brands where the continent will account for a quarter of the consumers goods market and 40% of total consumers growth (Calvert, 2014). It is expected that the findings from neuromarketing studies would contribute an enormous impact to help researchers understand consumers better. Therefore neuromarketing is significant because when



neuromarketing results are combined with other traditional marketing methods, it can be a powerful tool in predicting consumers.

The results gathered from neuromarketing studies should generously provide insights into consumers' mind-sets that traditional marketing test methods cannot offer. By complementing and supporting traditional research methods, neuromarketing is helping marketers to have a better understanding of consumers' preferences (Rehman, Shamsi, Rehman, Ali, & Faraz, 2016). The future of neuromarketing is optimistic and by applying neuromarketing, marketers can strategize and create smarter marketing tools that will boost the effectiveness of their marketing effort.

The consumers' subconscious response is a mystery that is still being investigated and studied by scientists, marketing scholars, and experts to explore further. Thus, there is a potential to discover consumers' decision making from the subconscious response that reveals hidden information about consumers behaviour which is not obtainable by traditional marketing methods (Hubert & Kenning, 2008; Ariely & Berns, 2010; Senior & Lee, 2008; and Roth, 2013). Nielsen & Fibabak (2014) see future potential in opening the subconscious minds of consumers' brains, which require further research and development especially in neuromarketing.

On the other hand, majority of the social sciences has yet to adopt neuroimaging as a standard research tool (Lee, Broderick, & Chamberlain, 2007). Due to the lack of expertise, high cost, and availability of the tools, neuromarketing approach was found to be challenging to adopt and adapt. It can also be concluded

that the application of neuroscience in neuromarketing study in Malaysia is very limited because the application and concept is still new in the Malaysian context, although neuromarketing is nothing new in the other parts of the world. More research should be conducted to fill the knowledge gap. Marketers and researchers should learn the techniques of reading basic human behaviour and utilize sciences to understand the ways consumers react to marketing campaigns. Thus, this study attempts to bridge this gap by examining consumers' behaviour towards basic marketing mix during decision making process.

The aim of this study is to gain a better understanding of the consumers' subconscious minds in making decisions using neuromarketing approach. With the help of neuroscience tools, it is important to have some knowledge of the consumers' subconscious minds, in such a way that may appropriately assist the marketers to adjust and improve their marketing strategies (Hubert, 2010; McDowell & Dick, 2013).

#### **1.4 Research objectives**

This study attempts to provide more detailed explorations on consumers' subconscious response regarding the effects of marketing functions on decision making process from the context of neuromarketing. The term decision making is used to refer to thoughts during product choice (Bao et al., 2003; Gardner and Hill, 1990 as cited from (Rezaei, 2015)). Therefore, the following research objectives are developed;

- Research Objective 1 : To identify the fixation area of marketing mix elements of green and non-green product in consumers' decision making.
- Research Objective 2 : To discover the level of amplitude and latency of marketing mix elements for the green products compared to non-green product in consumers' decision making.
- Research Objective 3 : To determine the significant difference between amplitude and latency of marketing mix elements for the green products compared to non-green product in consumers' decision making.
- Research Objective 4 : To examine the relationship between amplitude and latency of marketing mix elements for the green products compared to non-green product in consumers' decision making.

## 1.5 Research questions

In order to obtain answers to the problem, this research seeks to address the following research questions;

- Research Question 1 : What is the fixation area of marketing mix of green and non-green product that influences consumers' in decision making?
- Research Question 2 : What is the level of amplitude and latency of marketing mix elements for the green products compared to non-green product in consumers' decision making?
- Research Question 3 : Is there any significant difference between amplitude and latency of marketing mix elements for the green products compared to non-green product in consumers' decision making?
- Research Question 4 : Is there any relationship between amplitude and latency of marketing mix elements for the green products compared to non-green product in consumers' decision making?

## **1.6 Significance of the research**

The significance of the study can be measured by its conceptual contribution and methodological contribution. These contributions are outlined as follows.

### **1.6.1(a) Practical Contributions**

The study has explored the interactions between marketing mix and subconscious minds from eye movement and brain influence from the neuromarketing perspective towards consumers' decision making. The outcome of this study not only will provide benefits the industry players, but also will provide a clear framework of how companies can achieve sustainability by applying this idea. Given the high competitiveness in this industry, this research will help markets to better understand their primary consumers and ultimately make better marketing decisions that will impact the value of their products more acceptable.

The significance of the study is mainly for marketers and also to the researchers. This study benefits the marketers in analysing on the ways consumers' brains operate that determine the consumers' brand and the information that passes and does not pass through the consumers' brain filters. Thus, studying neuromarketing will expand the knowledge on how it influences the subconscious response in relation to decision making. This research also helps marketers to evaluate their current marketing practice and areas that need to be improved to ensure higher availability and response rate from the consumers. In addition, it also