E3 Journal of Business Management and Economics Vol.2(4). pp. 132-146, October, 2011
Available online http://www.e3journals.org/JBME
ISSN 2141-7482 © 2011 E3 Journals

Full length research paper

An empirical survey: Can green marketing really entice customers to pay more?

Ming-Yuan Hsieh

Department of International Business; National Taichung University140, Min-Shen Road, Taichung City, 40306, Taiwan (R.O.C.);Tel: +886-975-118-922; E-mail: uscpawisely@hotmail.com

Accepted 12 October 2011

This research integrated the Social Cognition Theory and the Engel Kollat Blackwell customers' purchasing model (EKB model) to synthetically discuss the three kinds of possible relations comprising "does negatively entice", "does possibly entice" and "does positively entice" between green-marketing and customers' purchasing and payment, with consideration given to environmental-protection issues. Based on the measured results, the most contributed contention of this research not only utilized three cross-analytical theories consisting of the social cognition theory (SCT) , the Fuzzy theory (FT) and the EKB model, and the novel F-ANP of the MCDM methodology to evaluate the collected data but it also manifested that Green-marketing does possibly entice customers to pay more (GMPECPM). These measured results have distinctly stunned the fundamental assumption in the traditional green-marketing research field that customers were supposed to be willing to pay more for green products and services because they were supporting green initiatives and helping environmental-protection. Further, major future research directions were also briefly demonstrated in this research as (1) the collection data have to be strengthened to gather more empirical customer feedback, corporate management comments, and professional scholars' reports; (2) enterprises have to resoundingly establish a green-branding initiative after successfully executing green-marketing strategies.

Keywords: Green Marketing (G-marketing); Multiple Criteria Decision Making (MCDM); Analytical Network Process (F-ANP).

Abbreviations: AE: Alternation Evaluation; AHP: Analytic Hierarchy Process; C: Choice; C.I.: Consistency Index; CNs: Crisp Set Numbers; C.R.: Consistency Ratio; CSR: Corporate Social Responsibility; EKB: Engel, Kollat and Blackwell; EKB model: Engel Kollat Blackwell customers' purchasing model; EP: Emotional Purchase; FT: Fuzzy Theory; F-ANP: Fuzzy Analytical Network Process; ICI: Individual Cognitivism Indicators; IS: Information Search; IP: Impulsive Purchase; G-brand: Green-branding; GA: Green Advertisement; GDS: Green Design; GD: Green Delivery; G-marketing: green marketing; GSC: Green Supply Chain; GM: Green Manufacture; GS: Green Service; GMNECPM: Green-marketing Does Negatively Entice Customers To Pay More; GMPECPM: Green-marketing Does Possibly Entice Customers To Pay More; GMPELCPM: Green-marketing Does Positively Entice Customers To Pay More; MCDM: Multiple Criteria Decision Making; NP: Non-plan Purchase; O: Outcomes; PBI: Personal Behaviorism Indicators; PR: Problem Recognition; R.I: Random Index; RP: Routine Purchase; RLP: Rational Purchase; SCT: Social Cognition Theory; SLT: Social Learning Theory; STFNs: Symmetrical Triangular Fuzzy Numbers; SOI: Social Observativism Indicators.

Introduction

As a result of recent natural and man-made calamities, both enterprises and customers have commenced to be aware of a series of grave environmental-protection issues. Based on a set of relative researches, all negative pollution under long-term industrial and economic development influences have generally resulted in the increase of carbon dioxide levels which decreases the oxygen levels and results in a serious acute "greenhouse effect" that causes the average temperature of the earth to rise. Therefore, more scientists have constantly insisted that developed countries comply with the international environmental regulations in order to effectively decrease the incremental levels of carbon dioxide and increase the number of the trees planted.

Due to the heightened awareness of protecting the natural environment, customers are increasingly considering boycotting high-polluting products and services. In the past, enterprises tended to pursue the goal of maximizing corporate profits with little consideration to environmental concerns (Charter and Polonsky, 1999). However, the innovative green idea was gradually included in the most critical goals of marketing that minimized the damage level to the natural environment, decreased the negative impact of human pollution and created ecological benefits for the entire world (Fisk, 1974). Polonsky (1994) expressed that manufacturers as well as service firms have recently shifted their manufacturing production, service and advertising to address customers' needs for better environmentally safe products and services (Coddington, 1993). For this reason, there are a series of environmental protection issues to be discussed and researched that covers the green supply chain, the green manufacturing and the green marketing ("G-marketing") (Fuller, 1999; Lee, 2008) in order to minimize the discharge of carbon dioxide in each operational business process. As highlighted in the book, "Green Marketing: Opportunity for Innovation" (Ottman, 1992), customers know that the less use of plastic and paper is good for the environment but usually have no idea about the product's manufacture procedures, delivery processes and advertisement approaches which can also potentially have a negative impact on the environment. Otherwise, based on the corporate marketing development, enterprises have started to move forward into the Marketing 3.0 value-oriented period (holistic marketing) from the Marketing 2.0 (social marketing). This indicates that customers have evolved into green consumers and enterprises have developed into green marketers or green manufacturers. Hence, enterprises have to create the core green value in their products and brands with balancing price and cost considerations.

In terms of identifying the development of customers' purchasing behaviors from a price consideration perspective, customers always have the definitive power and the right to decide how much to pay for the products they desire. Specifically, Polonsky (2002) broadly defined G-marketing as "all activities designed to generate and facilitate any exchanges intended to satisfy human needs or wants, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment" (Polonsky, 1994) in Marketing 2.0 (social marketing). Continuously, the appearance and population of the Corporate Social Responsibility ("CSR"), Kotler (2002) actively integrated the environmental and social issues into the marketing research field based on a contiguity of his accurate opinions in the concept of marketing 2.0 (social marketing) for developing the Market 3.0 (holistic marketing) because people naturally and gradually commence to emphasize on a series of the themes for discussion including healthcare, social safety, ecology, community etc (Henion and Kinnear, 1976).

In fact, there are several myths surrounding environmental-protection among customers. First, most customers are aware of the importance of protecting the environment but they still usually talk about their concern for the natural environment without taking actions. Secondly, customers tend to pursue the newest, fastest delivery and/or lowest price products and services that are often produced by enterprises using the lowest cost methods with high pollution in manufacturing, delivery and advertisements (Ottman, 1995).

Consequently, numerous researches have appeared to balance the compared interrelationship between the environment-protection and marketing profits. Most of these research results have distinctly indicated two conclusions comprising: (1) the majority of customers not only agree with the importance of environmental-protection but also respect the environmental-protection regulations; (2) environmentalists have advocated that most customers are definitely supposed to utilize their purchasing power to force enterprises to respect the environmental-protection regulations because customers' purchasing clout is definitely a positive influence to force enterprises to execute any kind of marketing strategy and business activity that will satisfy customers' demands and desires. Therefore, customers and enterprises are supposed to collaborate in the environmental-protection activities in order to create the lowest global pollution levels. However, the actual consequences have been that most enterprises do pollute the environment partly because majority of general customers are not certainly willing to pay more for green products. Hence, going back to the traditional assumption (Menon, 1997; Ottman, 2003; Peattie and Crane, 2005; Miller, 2008) in green marketing, the decisive question, "Can Green Marketing Really Entice Customers to Pay More?" has to be thoroughly discussed first for the research gap in the traditional researches in the green-marketing. Therefore, in order to find the answer, this research cross-employed the Engel, Kollat and Blackwell ("EKB") customers' purchasing model pioneered from the research of Engel, Kollat and Blackwell (1993) in consumer behavior field and the Social Cognition Theory ("SCT") explored from the research of Miller and Dollard (1941) in social integration field, to identify the correlations among individual cognition, personal behavior and social observation in a series of the relative customers' purchasing actions as expressed in Figure 1.

In order to further investigate and analyze the correlations in the customers' purchasing action processes, three customers' relationships comprising individual cognitivism, personal behaviorism and social observativism, have to be comprehensively discussed and evaluated. Hence, in order to avert the linguistic vagueness of the survey data, this research applied the Fuzzy Analytical Network Process ("F-ANP") approach of

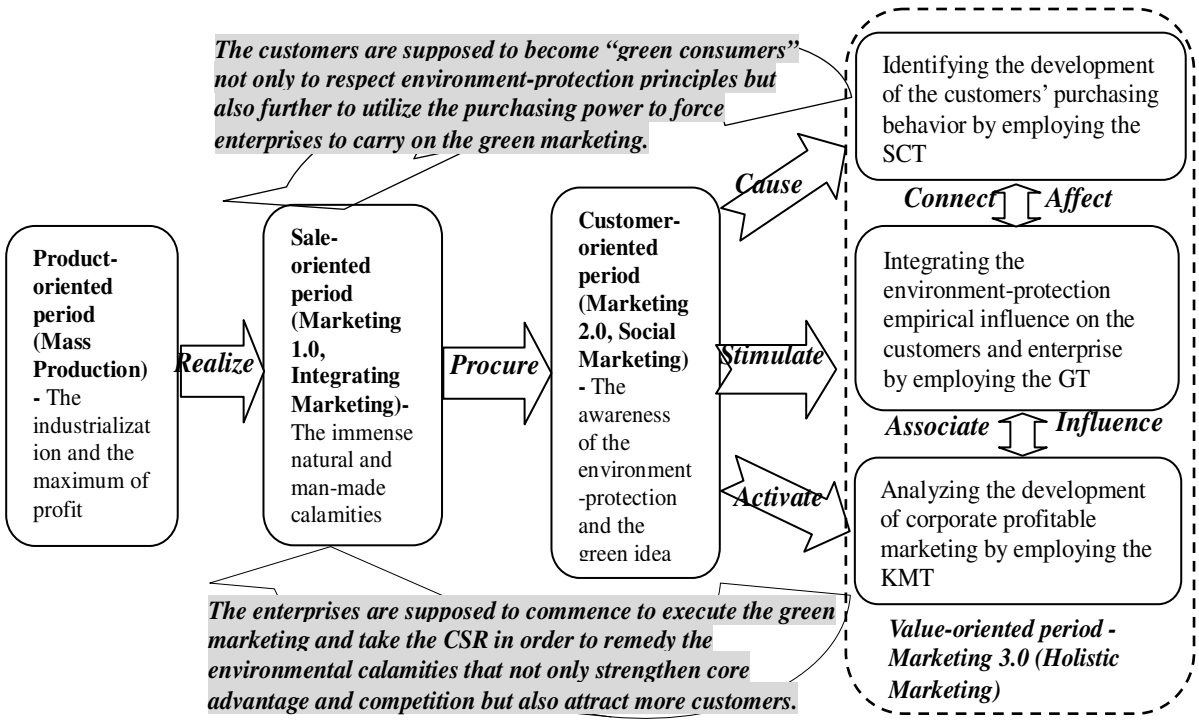

Figure 1: Connection between the motivations

the Multiple Criteria Decision Making ("MCDM") methodology for the statistical measurement, because the characteristic of the F-ANP could be applied to cross-analyze the questionnaire data through the four assessable hierarchical assess-relation which consisted of attitudes, criteria, sub-criteria and potential candidate schemes (Glorieux-Boutonnat, 2004). Consequently, the cross-analytical processes of the research design framework were to develop the four principal steps which comprised (1) identify the research target and motive in order to define the clear research questions;(2) employ the SCT theory and fuzzy theory;(3) utilize F-ANP approaches to cross-analyze empirical survey data; and (4) integrate overall analyses in order to inductively make conclusions and recommendations (Yang et al., 2005).

Related Literature Review

After reviewing the relative literatures in the green marketing field, there are a few studies that empirically probed, in qualitative research, the interrelationships among the customers' purchasing cognitions, cutomers' purchasing behaviors, and external environment influences through the synthetic application of the MCDM methodology. For this reason, this research considered the three main perspectives which comprised the customers' desire (individual cognitivism), customers' purchasing (personal behaviorism) and external green influence (social observativism) by employing the main social cognitive theory and the F-ANP approach of the MCDM methodology. Specifically, in order to distinctly approach the linguistic experts' comment and to comparatively emend evaluated scores, this research employs a five-level quantified figures of evaluation scale between languages of interviewees of pair wise in assessment of four relations (attitudes, criteria, sub-criteria and selected candidates) to effectively and efficiently cross-evaluate the three types of possibilities of G-marketing (selected schemes): (1) Green-marketing does negatively entice customers to pay more ("GMNECPM"); (2) Green-marketing does possibly entice customers to pay more ("GMPECPM"); and (3) Green-marketing does positively entice customers to pay more ("GMPELCPM"). Hence, this research will assist in identifying and selecting the most profitable tendency of G-marketing for enterprises.

Theoretical Literatures

Numerous researches have struggled to discover the relationship between academic theories and empirical behaviors in the customer purchasing field because the customers' purchasing is the final consequence beyond

a series of complicated decision-making processes through internal experience and assessment and external information searching and social influence. Subsequently, the core elements in customers' purchasing behaviors can generally be classified into three core evaluated perspectives comprising individual level, microenvironment, and macroenvironment (Schiffman and Kanuk, 1983).

Therefore, in terms of the analytical model for customers' purchasing process, Nicosia (1966) created the Nicosia model to simulate the customers' purchasing decision-making process through the use of the principal assessable elements comprising the following:

1. Internalized Process: customers commenced to construct the impression and attitudes for products after customers internalized various corporate marketing information.
2. Evaluated Process: customers start to have the purchasing motivation after completed the internalized information process.
3. Decisive Process: customers purchase products depended on the analytical results of evaluated process.
4. Feedback Process: customers gradually establish the complicated product or corporate impression in their mind in order to provide the relative experiences during re-purchasing.

Furthermore, Howard and Sheth (1969) pioneered the Howard-Sheth model through distinctly assessable factors comprising (1) imputed factors (or stimulated factors), (2) externally influenced factors, (3) internal factors and (4) outputted factors (responding factors). Kotler (1998) creatively argued that customers' purchasing process was a kind of block-decision box because majority of customers have always internalized the outside stimulations comprehended from corporate marketing effects (ex. promotion) and environmental (social) influences (ex. culture difference). After internalization, the customers will make a suitable purchasing decision that includes price and quantity decisions. Hence, enterprises are supposed to devote to analyzing the core factors of the customers' block-decision box in order to make the most profitable marketing strategy.

To recognize the decision-making process of the customers purchasing, Engel, Kollat and Blackwell (1984) completely and systematically created the Engel Kollat Blackwell customers' purchasing model ("EKB model") to explain customers' decision-making structure in their purchasing behaviors. There were five essential key-points in the model comprising the following:

1. Information Input: customers are stimulated by the external information from the markets (ex: mass media) or enterprises (ex: corporate marketing campaigns).
2. Information Processing: customers' responses regarding the imputed information and these responses consisted of attention, comprehension, acceptance/yielding and retention.
3. Decision Process: a series of customers' decision-making consideration comprehended problem recognition, information search, alternative evaluation, choice, and outcomes.
4. Decision Process Variables: the influenced variables in the decision process such as purchasing motivation, assessable criteria, life-style, routine-behavior, individual attitude and so on.
5. External Influences: a series of external impacted factors included family values, environmental effects, culture regulations, social sympathy and unpredictable conduct.

Furthermore, in order to probe the EKB model, the five core sessions of the Decision Process in the EKB model were discussed: (a) Problem Recognition: this was the first step in the decision process because the problem was produced from the difference between their demands and inputted information or when externally unpredicted stimulation appeared; (b) Information Search: the customers were going to look for the relative solutions in their existing experiences or seek the effective and useful information from external circumstance in order to solve the recognized problem; (c) Alternative Evaluation: the customers have executed various evaluations among each assessable criteria resulting from the obtained information and solution; (d) Choice: the customers were going to make the most beneficial choice after alternative evaluation and (f) Outcomes: there were two kinds of conducted consequences from the customers feeling. One will be satisfaction the other will be dissatisfaction.

The satisfied consequence is going to stimulate the customers to purchase again and on the contrary, non-satisfied consequence is going to force the customers re-execute the Decision Process from the step - (b) Information Search. Engel, Kollat and Blackwell (1993) comprehensively defined the principal customers' purchasing behaviors as consisting of (1) Emotional Purchase: it is the unpredicted purchasing behavior depending on the customers' emotion, (2) Impulsive Purchase: it is the unforeseen purchasing behavior resulting from the external marketing stimulation, (3) Routine Purchase: it is the purchasing of articles for daily use, (4) Rational Purchase: it is the regular purchasing for customers' life, and (5) Non-planned Purchase: it is the unconscious purchasing in customers' free time. Subsequently, the EKB model is demonstrated in Figure 2.

In terms of deeply and comprehensively expounding the three core components of a series of customers' purchasing, this research cross-employed the SCT and EKB purchasing model in order not only to intensively discuss the correlations between customers' purchasing

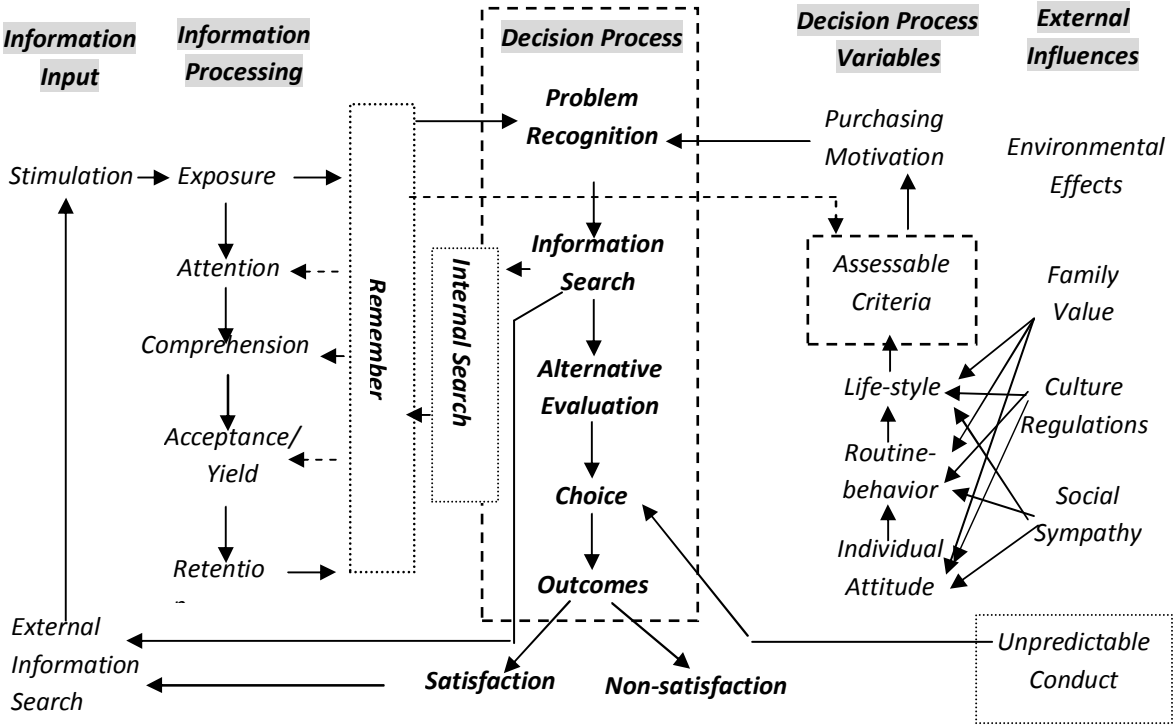

Figure 2: Engel, Kollat & Blackwell (EKB) model (Source: Engel, Blackwell and Miniard, 1993)

cognition and customers' purchasing behavior but also to extensively consider the impact of social relationship on the customers in this complicatedly contemporary society. Therefore, the SCT has gradually been the most innovative theory to deeply analyze the relative issues in the social research field. For the sake of the original concept of the SCT, Miller and Dollard (1941) creatively delivered the inventing model of the Social Learning Theory ("SLT") that is the most momentous and fundamentally social theory through the observation of various individual behaviors in society and the collection of the relative social literatures for a long time in order to deeply observe the development of human behaviors (Bandura, 1988). Moreover, Bandura (1989) subsequently integrated the relative concept of behaviorism and observativism into the SLT in order to develop the SCT and then, the SCT has been employed in various managerial science fields including education, healthcare management, medicine management, diagnosis management, human resource management and so on because the characteristics of the SCT is able to cross-analyze the dependent and independent relationships among individual cognitivism, behaviorism and environmental observativism to discuss the related humanity issues or situations (Bussey and Bandura, 1999).

Further, Kotler (2006) also integrated a continuity of marketing concepts to form the latest marketing viewpoint, holistic marketing, which organizes internal marketing, integrating marketing, relation marketing, and social responsibility marketing, in his 12 edited version of the book, "Marketing Management: Analysis, Planning, Implementation and Control". Holistic Marketing is able to connect each corporate stakeholder (e.g., management, marketing department, other departments, suppliers, customers and so on) through the application of the complete marketing principles and effective inner communication. Further, integrating marketing is to combine the traditional marketing activities including product, price, service and communication into the effectively modern marketing activities in order to achieve effective communication. The relationship marketing is, then, to establish the highest satisfaction and long-term relationship with stakeholders who are employees, management, shareholders, customers, suppliers and distributors. Subsequently, the social responsibility marketing is to construct long-term beneficial marketing strategy for the enterprises to benefit the society through valid methods in four main scopes including ethical improvement, regulations and laws, commerce environment and the entire society.

Furthermore, taking into consideration from an environmental perspective, the complete concept of G-marketing was clearly delivered and defined in the published Brundtland Report, "Sustainable Development Is Development That Meets The Needs of the Present Without Compromising The Ability of Future Generations to Meet Their Own Needs."

http://en.wikipedia.org/wiki/Sustainability at the international conference of the World Commission on the topic of sustainable development and environment.

Methodological Literatures

In terms of the in-depth discussion of the innovative methodology consisting of the Satty's F-ANP approach, the MCDM methodology is used in this study. Therefore, in terms of initial concept of the F-ANP, Saaty (1986) who was a professor at the University of Pittsburgh originally invented the AHP to address the more complicated and uncertain research questions through the analyses of expertise questionnaires because the original decision hypothesis principle (variable) of the AHP can define the "independence" among each assessable relationships. Therefore, the AHP is not only considered for its fundamental theory by some experts, such as scholars and decisive leaders but it also discusses the relationships (independence) of the research questions among each variable in the four basic hierarchies but it is also utilized to analyze the vertical cause-and-effect problems by hierarchical analysis among each relationship (attitudes, criteria, sub-criteria and candidates) by means of measuring the pair wise comparison matrix of the weighted assessable relationship. However, in order to solve more complicated issues with the vertically and horizontally "dependent correlations" among each assessable relationship and factor, Saaty (1998) further delivered the ANP to improve the AHP.

Subsequently, the ANP includes positive reciprocal matrix and super matrix in order to pierce out this limited hypothesis in order to carry on more complex hierarchical analysis by collecting expert's opinion through the Delphi method and brainstorm approach under the comprehensive, limited-resource and difficult-decision environment. According to the above reason, the ANP was created to deal with more complicated research problems and, based on the characteristics of the ANP, it can be utilized to deal with over twelve kinds of assessable research fields such as setting priority, generating a set of alternatives, choosing a best policy alternative, determining requirements, allocating resources, predicting outcomes, risk assessment, measuring performance, system design, ensuring system stability, optimization, planning, and conflict resolution.

In particular, Saaty (2005) addresses that the major difference between the AHP and the ANP is that the AHP is not able to directly evaluate each assessable criteria by hierarchical relations but that, on the contrary, ANP can be utilized to dispose of direct interdependence relationships and inter-influence between each criteria and criteria at the same or different levels by conducting the "supermatrix" (Saaty, 2006). For the sake of the evaluated model of the ANP, thus, "once the pair wise comparison is conducted and completed, the local priority vector w (eigenvector) is computed as the unique solution" (Saaty, 2006) and the w is represented as priority vector w (relative weights). Additionally, Saaty (2006) invented the two-stage algorithm to induce that, in each pair wise comparison matrix, the consistency of compared factors will match transitivity in order to fulfill the representativeness of the collected expert's opinions. The Consistency Index ("C.I.") was utilized to calculate each assessable criterion in the pair wise comparison matrix and the further, the Consistency Ratio ("C.R.") is utilized to estimate with the C.I. and the Random Index ("R.I") for confirming the correction of the evaluated model. The measured formula of the C.I. and the C.R. are expressed in the equation (1):

$$C.R. = \frac{C.I.}{R.I.}$$
$$C.I. = \frac{\lambda_{\max} - n}{n-1} \quad (1)$$

where the C.R. and C.I. evaluated numbers are imperiously smaller than 0.1.

However, in order to reduce the linguistic vagueness of the questionnaires so as to clearly reflect the factual meaning of the interviewees' responses during the survey process, Zadeh (1965) firstly created the fuzzy set and memberships of meaning to measure the Crisp Set Numbers ("CNs") as well as the Symmetrical Triangular Fuzzy Numbers ("STFNs") through the application of the t trigonometric function to clarify the equivocal uncertainty of the entire questionnaire collection because interviewees generally are limited in the choice-scale format of survey questionnaires. Subsequently, in the analytically hierarchical relations in the last level, each potential selected candidate has to match each assessable sub-criterion matched in each evaluated criterion through pair wise compared criteria of each sub-criteria through the calculation in equation (2). Moreover, each expert has to provide the weights ($W_1, W_2, ..., W_n$) of each attitudes, criteria, and sub-criteria based on their opinions (Zadeh, 1968). In order to quantify the analysis, the measurement of total fuzzy assessable numbers of the two-triangles, de-fuzzy is calculated as shown in equation (2).

$$\text{Total fuzzy assessable numbers} = \sqrt[n]{\prod_{i=1}^{n} W_i} \quad (2)$$

To effectively measure the quantitative defuzzifiction-measurement of the STENs for avoiding the linguistic vagueness resulted from the limitation of the choice-scale format, this research applied as well as adjusted the defuzzified measurement approach of Balli and Korukoglu (2009) as expressed in Figure 3 and equation 3.

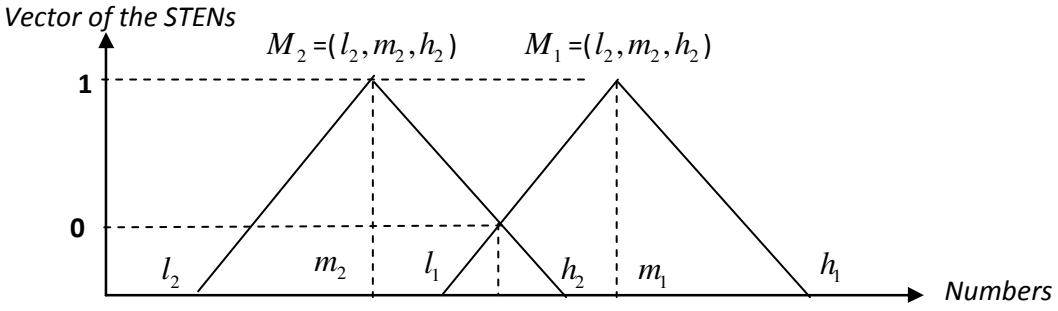

Figure 3: Intersection between the two STENs (M_1 and M_2)

where there are two the STFNs ($M_1 = (l_1, m_1, h_1)$ and $M_2 = (l_2, m_2, h_2)$) and the degree of possibility of $M_1 = (l_1, m_1, h_1) \le M_2 = (l_2, m_2, h_2)$ defined as:

$$v(\tilde{M}_1 \le \tilde{M}_2) = \sup_{x \le y}[\min(u_{\tilde{M}_1}(x), u_{\tilde{M}_2}(y))]$$ and further, was able to be expressed as:

$$v(\tilde{M}_1 \le \tilde{M}_2) = hgt(\tilde{M}_1 \cap \tilde{M}_2) = u_{M_2}(d)$$

weight = 1, if $m_2 \ge m_1$

= weight = $(h_2 - l_1)/((h_2 - l_1) + (m_2 - m_1))$, if $h_2 \le l_1$

weight = $(l_1 - h_2)/((l_1 - h_2) + (m_2 - m_1))$, otherwise (3)

s.t. (1) the value of fuzzy synthetic extent with reference to the i th object is expressed as: $S_i = \sum_{j=1}^{m} M_{gj}^{j} \otimes [\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gj}^{j}]^{(-1)}$

(2) in terms of calculation of the $\sum_{j=1}^{m} M_{gj}^{j}$, the performance of m extent analysis value of the fuzzy addition operation for a specific matrix as expressed as:

$$\sum_{j=1}^{m} M_{gj}^{j} = (\sum_{j=1}^{m} l_j, \sum_{j=1}^{m} m_j, \sum_{j=1}^{m} h_j)$$

(3) in order further to measure the value $(\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gj}^{j})^{(-1)}$ of , the performance of $M_{gj}^{j}(j = 1, 2, ..., m)$ value as expressed as:

$$\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gj}^{j} = (\sum_{j=1}^{m} l_j, \sum_{j=1}^{m} m_j, \sum_{j=1}^{m} h_j)$$

(4) the computation of the inverse vector $(\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gj}^{j})^{(-1)}$ can be expressed as:

$$(\sum_{i=1}^{n}\sum_{j=1}^{m} M_{gj}^{j})^{(-1)} = (1/\sum_{i=1}^{n} h_j, 1/\sum_{i=1}^{n} m_j, 1/\sum_{j=1}^{n} l_j)$$

Consequently, after equation (3) completed, the comprehensive weights as measured:

Comprehensive weights W_C

= attitude weights W_A * criterion weights W_C * selection candidate weights W_{SC} (4)

Comprehensively reviewing and integrating the main SCT and the brief F-ANP measured approaches, not only revealed the relationships between each candidate as discussed, but also further best potential candidate is decided. Hence, the most critical contribution in this research is that the crisp set and fuzzy set are both considered and even measured based on employing the characteristics of the A-ANP approach of the MCDM methodology.

Research Measure

For the purpose of effectively evaluating integrity and uncertainty, the F-ANP approach was used by employing a collection of surveyed data from the opinions of customers and experts that was analyzed in order to achieve retrospective cross-sectional analysis of the relations among the enterprises from three estimated indicators consisting of customer care, marketing and environmental indicators. This chapter characterized the overall research design and research specification of analytical methodology as well as creates the comparison among each appraised criterion of the relationship for attitudes, criteria, sub-criteria and selected candidates.

Research Design Framework

The overall related-impacted factors are categorized into three assessable attitudes which match the cross-analytical perspectives and then, these attitudes are going to be decomposed as the next two hierarchy relationships comprising criteria and sub-criteria for measuring the weights of the selected candidates (schemes). According to measured characteristics of the F-ANP, the fundamental framework of the research design regarding cross-analyzing the four hieratical relationships as described in Figure 4 (Hsieh et al., 2010).

In accordance with Figure 4, in terms of the comprehensive consideration of the overall research steps, the four principal research design steps comprise identifying the motivation, selecting the methodology, utilizing methodology to analyze the empirically collected data and to appraise overall assessable criteria by applying the Delphi method in order to make a comprehensive conclusion and suggestion as presented in figure 5.

After completing the research design framework as expressed in Figure 4 and the analytical processes as presented in Figure 5, the assessable criteria in this research is then used to identify and analyze the consistency of the three best potential candidates comprising: (1) Green-marketing does negatively entice customers to pay more (GMNECPM); (2) Green-marketing does possibly entice customers to pay more (GMPECPM); and (3) Green-marketing does positively entice customers to pay more (GMPELCPM). Hence, this research will assist in identifying and selecting the most profitable tendency of G-marketing for enterprises. Eventually, according to reviewing the relative literatures, the nineteen sub-criteria are categorized into the three assessed criteria as follows:

1. Individual Cognitivism Indicators (ICI): Engel, Kollat and Blackwell (1993) constructed the complete EKB model to deeply and systematically expound a series of customers' purchasing behaviors. Therefore, the core six components of the EKB model were utilized to be assessable criteria in the individual cognitivism indicators. Further, a total of six sub-criteria are categorized in the customers' cognition perspective comprising the Problem Recognition ("PR"), the Information Search ("IS"), the Alternation Evaluation ("AE"), the Choice ("C") and the Outcomes ("O"). These criteria have an overall effect on the customers' desires.
2. Personal Behaviorism Indicators (PBI): After a thorough review of numerous marketing literatures (Ancarani and Shankar, 2004; Chen and Yu, 2004; Kotler, 2006), there were a significant number of types of marketing such as mass marketing, mega marketing, internal marketing, relationship marketing, integrating marketing and social responsibility marketing. Hence, the marketing doctrine of evolution was apparently developed towards making the entire world better from a perspective focused on product selling and customer satisfaction and loyalty. Hence, Kotler (2006) integrated current principle marketing doctrines into the comprehensive market doctrine – holistic marketing. In addition, there was a common point in these marketing doctrines that mostly employs the fundamental four principal maketing viewpoints to develop assessable indictors. Moreover, after pondering over the criteria of qualitative and quantitative review from a customer's purchasing behavior, there were five concerned sub-criteria consisting of Emotional Purchase ("EP"), Impulsive Purchase ("IP"), Routine Purchase ("RP"), Rational Purchase ("RLP") and Non-plan Purchase ("NP").
3. Social Obervativism Indicators (SOI): Sarkis (1998) deemed that the environmental-protection ideas and actions of enterprises contain not only the internal parts of enterprises but also the external parts for the entire society. Furthermore, Ottman (2006) comprehensively expressed that the most effective and strengthened action for the environmental-protection requirement is for enterprises to genuinely incorporate the green idea into all of their commerce activities from initial product design to production to product delivery, service and advertising. Most importantly, enterprises must also take on more social responsibilities such as taking care of employees' retirement, taking care of people who are in fragile situations (e.g., war, sickness and disaster), and assisting poor students in order to obtain better educational opportunities (Ottman, 2008). This is especially true if these enterprises have obtained government resources. Based on experts' opinion in the criteria of qualitative and quantitative review, the seven assessable sub-criteria are organized into environmental-protection perspective comprising the Green Design ("GDS"), the Green Supply Chain ("GSC"), the Green Manufacture ("GM"), the Green Delivery ("GD"), the Green Service ("GS"), and the Green Advertisement ("GA") (Higgins, Hajkowicz and Bui, 2008). See figure 6

Research Specification of Analytical data

Dalkey and Helmer (1963) delivered that there are the least errors of validity and reliability in the Delphi method when the collected questionnaires are at least over twenty percent of surveyed data. Furthermore, in terms of

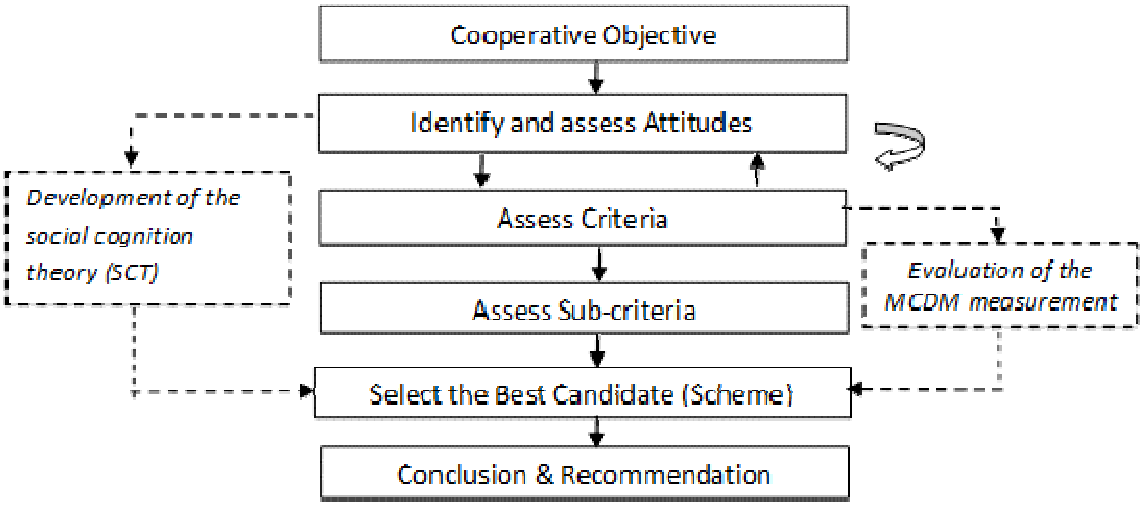

Figure 4: The design framework

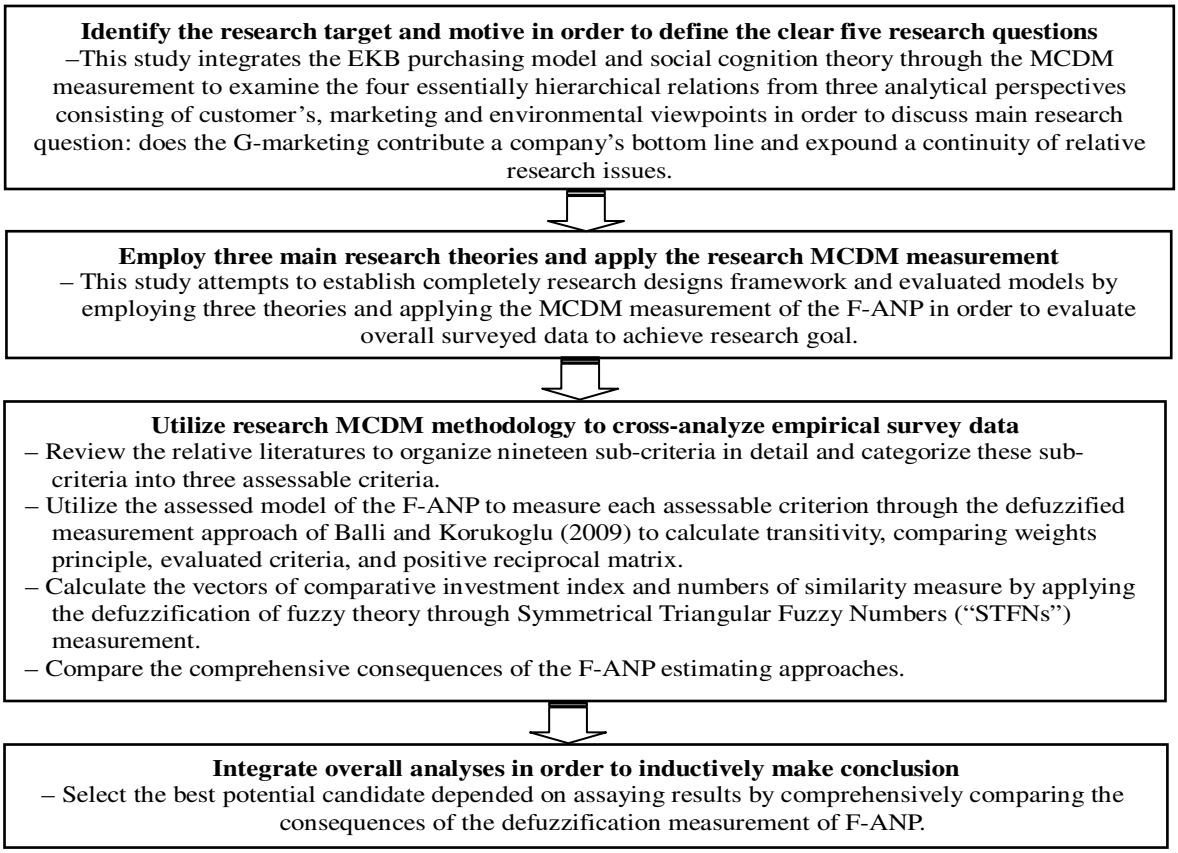

Figure 5: The research analytical processes

the full representativeness of the collection of the three main perspectives comprising the existing customers, corporate managements and environmental-protection scholars, into the cross-analyzing measurements, the first five questionnaires out of ten sent were completed by random existing customers and then, five questionnaires out of eight sent were completed by specific senior managers who have over twenty years of experience working for international companies listed in a major stock exchange market and the final five

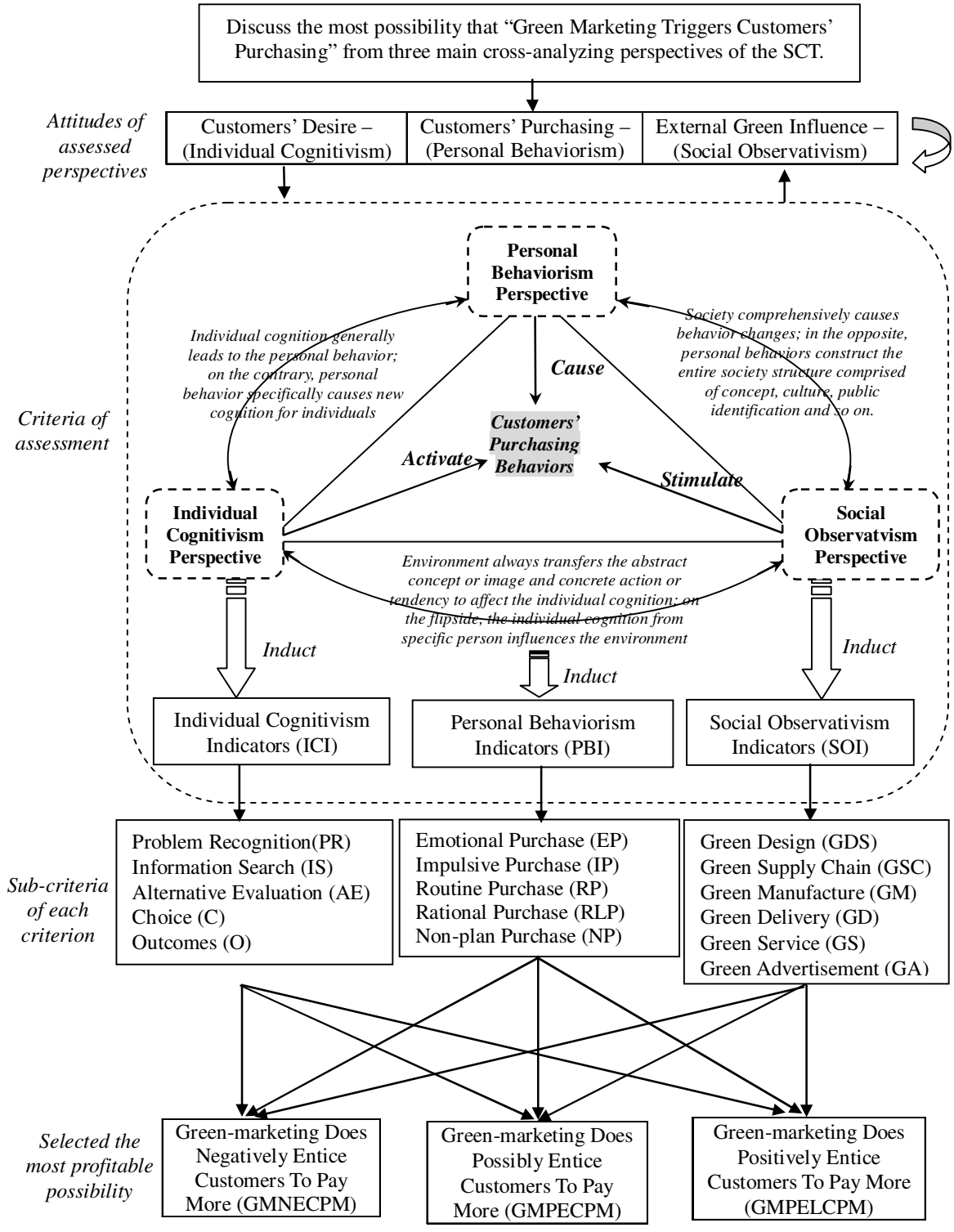

Figure 6: The cross-analytical processes of the hierarchal relations

questionnaires out of nine sent were completed by designated senior scholars specializing either in customer service, marketing or environmental management research fields for at least ten years. The aggregate collection was approximately fifty-five percent which is more than twenty percent of questionaires sent. Therefore, the interviewees' opinions of surveyed questionnaires are designed as shown in figure 7 and the

Attitudes of assessed perspective 1	1	2	3	4	5	Attitudes of assessed perspective 2
	Equal----------Extreme Important					
Assessed Criteria 1	1	2	3	4	5	Assessed Criteria 1
	Equal----------Extreme Important					
Sub-criterion 1	1	2	3	4	5	Sub-criterion 2
	Equal----------Extreme Important					
Selected candidate 1	1	2	3	4	5	Selected Candidate 2
	Equal----------Extreme Important					

Figure 7: The evaluation scale of pairwise assessment

questionnaire structure is based on the level of importance from equal importance (1) to extreme importance (5) (The Likert scale).

Subsequently, based on the assessable characteristics of the F-ANP, the pair wise comparisons of the assessed attitudes, criteria and attribution at each level are evaluated with respect to the related dependence and interdependence by completely measuring the fuzzy transitivity, comparing the weights principle, evaluating the criteria, and estimating the positive reciprocal matrix and supermatrix in the MCDM methodology. (Dalkey, 1972; Dalkey and Rourke, 1972; Triantaphyllou, 1989; Higgins, Hajkowicz and Bui, 2008)

Empirical Analysis

In order to intelligibly execute the empirical assessment processes of survey collections, the F-ANP approaches of the MCDM methodology was applied for averting the linguistic vagueness in this section because the combination of the ANP approach and fuzzy theory is the most effective and efficient methodology to assay the selected candidate by considering transitivity and consistency of selection among the best potential relations. Therefore, there were three measured steps in this section.

organize the survey collections: First of all, the survey scale of experts' opinion ranges from 1 to 5 which represented the degree of importance between three attitude comparative factors (customers' desire, customers' purchasing and external green influence) matched the three core key-elements of the SCT (Individual Cognitivism, Personal Behavorism and Social Observativism) between attitudes and criteria. In terms of specific characteristics of the F-ANP evaluation, the equation (2) was used to calculate the fifteen collected expert surveyed questionnaires. Further, from customers' desire (attitude) perspective, the criteria pair wise comparison matrix for the criteria of assessment is presented in Table 1 and from the individual cognitivism indicators ("ICI"), the attitude pair wise comparison matrix for the criteria of ICI is expressed in Table 2.

Consequently, the total the criteria pairwise comparison matrix for the criteria assessment from the three attitude's perspectives consisted of customers' desire (individual cognitivism), customers' purchasing (personal behaviorism) and external green influence (social observativism). The attitude pair wise comparison matrix for the criteria of assessment from the three criteria perspectives comprised individual cognitivism indicators (ICI), personal behaviorism indicators (PBI) and social observativism indicators (SOI), as articulately measured through equations (1) and (2).

Measure the comprehensive weights between attitudes and criteria: After obtaining each pair wise comparison matrix of the attitudes and criteria, equation (3) was synthetically able to measure the comprehensive weights (attitude weights W_{A*} criterion weights W_C) between attitudes and criteria as presented in Table 3.

Measure the comprehensive weights between attitudes and criteria: Moreover, the survey scale of expert's opinion ranges from 1 to 5 which represented the degree of importance between three criteria comparative factors (individual cognitivism indicators, personal behaviorism indicators and social observativisim) matched the three core key-elements of the SCT (Individual Cognitivism, Personal Behavorism and Social Observativism) between criteria and sub-criteria. In terms of specific characteristics of the F-ANP evaluation, equation (2) was used to calculate the fifteen collected expert surveyed questionnaires. Further, from individual cognitivism indicators (ICI) perspective, the sub-criteria pair wise comparison matrix for the criteria assessment is presented in Table 4 and from first selection candidate (Green-marketing Does Negatively Entice Customers To Pay More, GMNECPM) perspective, the sub-criteria pair wise comparison matrix for the selection candidate of the GMNECPM is expressed in Table 5.

Table 1: The criteria pairwise matrix for the attitudes of customers' desire

Customers' Desire	Individual Cognitivism Indicators (ICI)			Personal Behaviorism Indicators (PBI)			Social Observativism Indicators (SOI)		
Individual Cognitivism Indicators (ICI)	1	1	1	2	2.8297	3	3	3.5166	4
Personal Behaviorism Indicators (PBI)	0.5	0.3534	0.3333	1	1	1	3	3.2682	4
Social Observativism Indicators (SOI)	0.3333	0.2844	0.25	0.3333	0.306	0.25	1	1	1
C.I.= 0.0529 , C.R.= 0.0913									

Table 2: The attitude pairwise matrix for the criteria of individual cognitivism indicators

Individual Cognitivism Indicators (ICI)	Customers' Desire			Customers' Purchasing			External Influence		Green
Customers' Desire	1	1	1	2	2.721	3	3	3.722	4
Customers' Purchasing	0.5	0.3675	0.3333	1	1	1	3	3.1588	4
External Green Influence	0.3333	0.2687	0.25	0.3333	0.3166	0.25	1	1	1
C.I.= 0.0395 , C.R.= 0.0681									

Table 3: The comprehensive weights between attitudes and criteria

	Individual Cognitivism Indicators (ICI)	Personal Behaviorism Indicators (PBI)	Social Observativism Indicators (SOI)
Customers' Desire	0.187		
Customers' Purchasing		0.2388	
External Green Influence			0.5327

Table 4: The sub-criteria pairwise matrix for the criteria of individual cognitivism indicators

Individual Cognitivism Indicators (ICI)	Problem Recognition (PR)	Information Search (IS)	Alternative Evaluation (AE)	Choice (C)	Outcomes (O)
Problem Recognition (PR)	1	2.8745	2.8374	3.2593	4.4862
Information Search (IS)	0.3479	1	2.6484	2.4915	4.439
Alternative Evaluation (AE)	0.3524	0.3776	1	2.8799	4.4669
Choice (C)	0.3068	0.4014	0.3472	1	4.6416
Outcomes (O)	0.2229	0.2253	0.2239	0.2154	1
C.I.= 0.1098 , C.R.= 0.098					

Consequently, the comprehensive pair wise comparison matrix for the attitude, criteria, sub-criteria and selection candidates assessment from the three attitude's perspectives consisted of customers' desire (individual cognitivism), customers' purchasing (personal behaviorism) and external green influence (social observativism) and the attitude pair wise comparison matrix for the criteria of assessment from the three criteria perspectives comprising individual cognitivism indicators (ICI), personal behaviorism indicators ("PBI") and social observativism indicators ("SOI"), are precisely measured through equation (2), (3) and (4). Eventually, based on the processing manipulation, the overall F-ANP outcome of complete importance of related priority weights w (eigenvector) were measured by utilizing equation (4) and all the calculated and evaluated procedures of the pair wise comparison matrix of each attitude, criterion, sub-criterion and selection candidate as presented in Table 6.

According to Table 6, the three assessed results for green-marketing does possibly entice customers to pay more (GMPECPM) was 0.3394, which is higher than the green-marketing does negatively entice customers to pay more (GMNECPM) at 0.3338 and green-marketing does

Table 5: The sub-criteria pairwise matrix for the selection candidate of the GWNTCP

GMNECPM (Candidates)	Problem Recognition (PR)	Information Search (IS)	Alternative Evaluation (AE)	Choice (C)	Outcomes (O)
Problem Recognition (PR)	1	2.4166	2.5309	4.1112	4.3547
Information Search (IS)	0.4138	1	2.9302	3.7838	4.1289
Alternative Evaluation (AE)	0.3951	0.3413	1	3.0209	3.9317
Choice (C)	0.2432	0.2643	0.331	1	4.2089
Outcomes (O)	0.2296	0.2422	0.2543	0.2376	1
C.I.= 0.11 , C.R.= 0.098					

Table 6: The comprehensive weights between attitudes and criteria

Criteria	Sub-criteria	GMNECPM		GMPECPM		GMPELCPM	
		Weights	Score(F-ANP)	Weights	Score(F-ANP)	Weights	Score(F-ANP)
Individual Cognitivism Indicators (ICI) (0.187)	PR(0.006)	0.0777	0.0001	0.0562	0.0001	0.0621	0.0001
	IS(0.0962)	0.1286	0.0023	0.0104	0.0002	0.1482	0.0027
	AE(0.0963)	0.0385	0.0007	0.0735	0.0013	0.1716	0.0031
	C (0.2451)	0.232	0.0106	0.3174	0.0145	0.1643	0.0075
	O(0.5564)	0.5231	0.0544	0.5425	0.0564	0.4538	0.0472
Personal Behaviorism Indicators (PBI) (0.2388)	EP(0.0912)	0.1332	0.0029	0.0264	0.0006	0.0836	0.0018
	IP(0.1339)	0.0439	0.0014	0.1216	0.0039	0.1186	0.0038
	RP(0.0903)	0.124	0.0027	0.1018	0.0022	0.0927	0.002
	RLP(0.2044)	0.2107	0.0103	0.2382	0.0116	0.2171	0.0106
	NP(0.4802)	0.4882	0.056	0.512	0.0587	0.488	0.056
Social Observativism Indicators (SOI) (0.5327)	GDS (0.0283)	0.0842	0.0013	0.0455	0.0007	0.0343	0.0005
	GSC(0.0893)	0.025	0.0012	0.0687	0.0033	0.048	0.0023
	GMF(0.0114)	0.1147	0.0007	0.096	0.0006	0.1078	0.0007
	GD(0.1753)	0.0418	0.0039	0.1216	0.0114	0.1051	0.0098
	GS(0.3479)	0.3672	0.068	0.3341	0.0619	0.3524	0.0653
	GM(0.3479)	0.3672	0.068	0.3341	0.0619	0.3524	0.0653
The comprehensive weights			**0.3338***		**0.3394***		**0.3269***
* The numbers of the each comprehensive weight was normalized.							

positively entice customers to pay more (GMPELCPM) at 0.3269.

Conclusion and Recommendation

In this dynamic-changing and hypercompetitive commerce era, enterprises have to successfully manipulate their entire resources not only to cut down cost in manufacturing but to also create the most effective and beneficial marketing strategy in order to strengthen their competitive advantages to satisfy the customers' demands. For this reason, this research attempts to discover the most innovative marketing strategy for empirical enterprises. However, after reviewing the relative literatures, there is a commonly fundamental assumption in traditional green marketing researches that "customers will generally pay more for green products and services if customers do support the green concept initiative (cognition)." Nevertheless, is it true that green marketing really does entice customers to pay more? In order to intelligibly assay this fundamental assumption (research gap), this research cross-employed the SCT and the EKB model through the F-ANP of MCDM methodology to assess the three kind of possible relations comprising of "does negatively", "does possibly" and "does positively" between green-marketing and the amount customers are willing to pay, with consideration given to environmental-protection issues. The most contributed contention of this research not only utilizes the SCT and the EKB model with the novel F-ANP of the MCDM methodology to evaluate the collected data but it also manifests the direct and distinct answer to the main research question that "Green-marketing does possibly entice customers to pay more (GMPECPM)", according to the measured results. Furthermore, this result has

distinctly stunned the fundamental assumption in the traditional green-marketing research field that customers are supposed to be willing to pay more for green products and services because they are supporting green initiatives and helping the environment.

In terms of the research limitation, in spite of the feature of the F-AHP that was employed in this research (Triantaphyllou, 2000; Saaty and Cillo, 2009), the questionnaires were only given to general customers, corporate managers and environmental-protection scholars with a combined response rate of approximately fifty-five percent. Although this response rate is above the 20 percent requirement, the representativeness of the survey data is still a main limitation of this research. Further, the applied MCDM measurement has an estimated limitation which represents the second limitation of this research. Therefore, all of the interviewees in this research had to be senior experts in order to technically reflect the factual condition with their accumulated professional knowledge and valuable experience.

Further, in connection with demonstrating the correlation between customers (customers' benefits), enterprises (corporate profits), and environment (environmental-protection), there are three key-point issues for future research direction beyond this study. These three issues include: (1) how to improve the research limitation in this research? (2) Is there any possibility to extensively expound in the green-marketing from the three main cross-analytical perspectives (customers' price considerations, corporate profit targets, and environment-protection regulations)? and (3) what is the next step for enterprises after introducing and implementing a G-marketing strategy? In terms of preliminary solutions for these vital issues, there are two major future research directions. First, in order to strengthen the representativeness of the cross-analytical collection data, the collection data have to be gathered from more empirical customer feedback, corporate management comments, and professional scholars' reports in order to develop a more comprehensive evaluated model to cross-analyze more in-depth vertical and horizontal relationships among each assessable factor and indicator. Second, it is potentially very critical that a successful corporate impression will affect the tendency of customers' purchasing decisions. Hence, enterprises have to successfully construct a green-branding ("G-branding") initiative after executing G-marketing strategies in order to entice more customers.

References

Ancarani F, Shankar V (2004). Price levels and price dispersion across and within multiple retailer channels. Further evidence and extension. J. Acad. Marketing Sci., 32(2): 176-87.

Balli S, Korukoglu S (2009). Operating system selection using fuzzy AHP and TOPSIS method. Ege University, Bornova, Izmir, Turkey.

Bandura A (1988). Organizational Application of Social Cognitive Theory. Australian J. Manage., 13(2): 275-302.

Bandura A (1989). Human Agency in Social Cognitive Theory. American Psychologist. 44: 1175-1184.

Bussey K, Bandura A (1999). Social cognitive theory of gender development and differentiation. Psychol. Rev. 106: 676-713.

Charter M, Polonsky MJ (1999). Greener Marketing: a Global Perspective. Greening Marketing Practice, 2nd edn. Greenleaf: Sheffield.

Chen YP, Yu YH (2004). Ping Heng Ji Fen Ka Wan Quan Jiao Zhan Shou Ce. Taiwan: Merlin Publishing Co., Ltd.

Coddington W (1993). Environmental Marketing: Positive Strategies for Reaching the Green Consumer. McGraw-Hill: New York.

Dalkey NC, Helmer O (1963). An experimental application of the Delphi method to the use of experts. Manage. Sci., 9(3): 458-467.

Dalkey NC (1972). The Delphi method: An experimental study of group opinion. In N. C. Dalkey, D. L. Rourke, R. Lewis, and D. Snyder (Eds.). Studies in the quality of life: Delphi and decision-making. Lexington, MA: Lexington Books, 13-54.

Dalkey NC, Rourke DL (1972). Experimental assessment of Delphi procedures with group value judgments. In N. C. Dalkey, D. L. Rourke, R. Lewis, and D. Snyder (Eds.). Studies in the quality of life: Delphi and decision-making. Lexington, MA: Lexington Books, 55-83.

Engel JF, Kollat DT, Blackwell RD (1984). Consumer Behavior (4th ed). The Dryden Press, Chicago

Engel JF, Kollat DT, Blackwell RD (1993). Consumer Behavior, MI:The Dryden Press, Chicago.

Fisk G (1974). Marketing and the Ecological Crisis. Harper and Row: London.

Fuller D (1999). Sustainable Marketing: Managerial– Ecological Issues, Sage: Thousand Oaks, CA.

Glorieux BA (2004). Can the environment help boost your marketing. The Australian J. Dairy Technol., 59(2): 1-24.

Henion K, Kinnear T (1976). A guide to ecological marketing in Karl E. Henion and Thomas C. Kinnear (Eds). Ecological Marketing. Colombus, Ohio: American Marketing Association.

Hsieh MY, Huang CH, Wu WM (2010). Can Green Marketing Contribute to A Company's Bottom Line. 2010 Global Service Industrial and Marketing Management International Conference, National Taiwan University, Taipei City, Taiwan.

Higgins A, Hajkowic S, Bui E (2008). A multi-objective model for environmental investment decision making. Computers and Operations Research, 35: 253–66.

Howard JA, Sheth JN (1969). The Theory of Buyer Behavior, New York, Appleton–Century – Crofts Co., 28-45.

Kotler P (1967). Marketing Management (1st ed), Englewood Cliffs, New Jersey: Prentice-Hall.

Kotler P (1991). Marketing Management (7th ed), Englewood Cliffs, New Jersey: Prentice-Hall.

Kotler P, Ang SH, Leong SM (1998). Marketing Management-An Asian Perspective, Prentice-Hall Inc.

Kotler P, Armstrong G (2001). Principles of Marketing (9th ed), Prentice Hill, New Jersey.

Kotler et al. (2001). Principles of marketing. Prentice Hal Europe and Pearson Education Lmited.

Kotler P, Armstrong G (2002). Marketing Management: Analysis, Planning, Implement and Control (12th ed), Prentice Hill, New Jersey.

Kotler P, Armstrong G (2003). Marketing Management (11th ed), Prentice Hill, New Jersey.

Kotler P (2006). Marketing Management (7th ed), Prentice Hill, New Jersey.

Lee K (2008). Opportunities for green marketing: young consumers. Marketing Intelligence and Planning, 26(6): 573 – 586.

Menon A (1997). Enviropreneurial marketing strategy: the emergence of corporate environmentalism as market strategy. J. Marketing, 61: 51–67.

Miller M (2008). Green is good. Target Marketing, 3:61-62.

Miller NE, Dollard J (1941). Social Learning and Imitation. New Haven: Yale University Press.

Nicosia F (1966). Consumer Decision Processes: Markting and Advertising Implications. Prentice Hall.

Ottman JA (1992). Greener Marketing. NTC: Lincolnwood, IL.

Ottman JA (1995). When it comes to Green Marketing, Companies are Finally Getting it Right, Brandweek, 36(16): 17.
Ottman JA (2003). Green Marketing: Hey, Corporate America – It's Time to Rethink the Products, Business, 25(4):31.
Ottman JA (2006). The Rules of Green Marketing. Marketing Profs available at http://www.marketingprofs.com, retrieved March 2008
Ottman JA (2008). The five Simple Rules of Green Marketing. Design Manage. Rev., 19(4): 65-72.
Peattie K, Crane A (2005). Green Marketing: Legend, Myth, Farce or Prophesy. Qualitative Market Research, 8: 357-370.
Polonsky MJ (1994). An introduction to green marketing. Electronic Green J., 1(2): 1-9.
Prakash A (2002). Green marketing, public policy and managerial strategies. Bus. Strateg. Environ., 11: 285-297.
Saaty TL (1996). Decision Making with Dependence and Feedback: The Analytic Network Process, RWS Publications, Pittsburgh, PA.
Saaty TL (1998). Multi-criteria decision making: the analytic hierarchy process, RWS Publications, Pittsburgh, PA.
Saaty TL (2005). Theory and Applications of the Analytic Network Process: Decision Making with Benefits, Opportunities, Costs and Risks. Pittsburgh, Pennsylvania: RWS Publications.
Saaty TL, Vargas LG (2006). Decision Making with the Analytic Network Process: Economic, Political, Social and Technological Applications with Benefits, Opportunities, Costs and Risks. New York: Springer.
Saaty TL, Cillo B (2009). A Dictionary of Complex Decisions using the Analytic Network Process. Pittsburgh, Pennsylvania: RWS Publications.
Sarkis J (1998). Evaluating environment conscious business practices, Eur. J. Operational Res., 107(1): 59-74.
Schiffman LG, Kanuk LL (1983). Customer Behavior, Bookstore, New York.
Triantaphyllou E (1989). An examination of the effectiveness of multi-dimensional decision-making methods: A decision-making paradox. Decision Support Systems, 5: 303–12.
Triantaphyllou E (2000). Multi-Criteria Decision Making: A Comparative Study. Dordrecht, The Netherlands: Kluwer Academic Publishers (now Springer). 320.
Zadeh LA (1965). Fuzzy sets. Information and Control, 8(3): 338–353.
Zadeh LA (1968). Fuzzy algorithms. Information and Control, 12(2): 94–102.