The Research of Relationship between Market Share and Quality Perception of Customer from Network Externalities and Involvement Perspectives

GOU-FONG LIAW, ZONG-WEI ZHU, YAO-HSIEN LEE[*]

ABSTRACT

The purpose of this research is to examine the relationship between market share and quality perception from perspectives of network externality and customer involvement differences. According to the study of Hellofs and Jacobson (1999), the relationship between market share and quality perception is influenced by network externality. When a product has positive network externality, market share and quality perceptions are positively correlated; the same applies to negative correlation. Upon the assumption that most literatures support positive correlation between market share and quality perception, this study sets agenda to see if the result will be consistent providing network externality and involvement type are both taken into account. Another concern is whether customers' perceptions of product quality change over characteristics of different products. This research attempts to establish a framework based upon network externality and involvement type to reveal the relationship between market share and quality perception. Findings show that when a product has positive network externality, customers of different involvement types conclude the same perception of market share and quality as Hellofs and Jacobson (1999). However, for either positive or negative externality, customers of different involvement types perceive quality differently in intrinsic and extrinsic products. Therefore, this research raises a new point towards the relationship between market share and quality perception more than extends the stance of Hellofs and Jacobson (1999).

Keywords: network externality, involvement type, quality perception

I. INTRODUCTION

"Being market-driven or customer-oriented" is one core issue in marketing theory (Kotler, (2002)), which implies we may tell a product makes or breaks by a quick look at market share and quality perception of customer (Charles and Gareth,(1998)). In Hellofs and Jacobson's (1999) discussion about the relationship between market share and customers' quality perceptions, market share can influence quality by creating positive network externality. In other words, when a

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product has positive network externality, bigger market share brings higher quality perception of customer. In fact, customers perceive vaguely towards what message market share embodies. The same message unveils differently in the eyes of different involvement type customers. Zeithaml (1988) thinks that customers gather information before purchase, and market share of a product is one piece of information. When facing a product with big market share, customers of different involvement types are likely or not to be influenced by this information and reduce their info gathering efforts remains yet to be addressed. For example, customers of rational involvement interpret market share differently from the ones of emotional type, and such difference further affects their quality perceptions. In the past, very few consumer behavior literatures address the moderating role of customers' involvement type in the effect of market share on customers' quality perception. Hence, this research centers on whether market share conveys different messages to customers of different involvement types and moreover creates different quality perceptions.

Hellofs and Jacobson (1999) concludes that, in discussion of how network externality moderate the relationship between market share and customers' quality perception, positive network externality occurs with positive correlation between market share and quality perception, while negative network externality entails negative correlation of such. Thus, the effect that more customers are buying certain product (bigger market share) has on quality perception is related with network externality. For positive network externality, customers benefit from positives such as economies of scale, minimal risk, and words of mouth (Economides, (1996)). Yet too many customers for one product (i.e. market share is beyond critical threshold) will incur such negative effects as crowds and lost uniqueness. On the other hand, lost uniqueness from big market share also reduces purchase risk. The result depends on what type of customer is in question: emotional customers regard highly of product singularity and detest too many people shopping the same thing, while rational customers view others' same purchase as proof of product reputation and minimized risk. Thus, it is not enough to consider only network externality in discussion of how market share influences quality perception of customer. It is possible to discover new aspects in informative effects of market share if involvement type of customer is put into factor. Thereon

this research engages network externality and involvement type of customer simultaneously to examine how market share impacts quality perception of customer, and practically to clarify the optimization of market share strategy for business strategy planning.

II. BACKGROUND AND THEORY

1. Market Share

Market share is one profitability indicator for businesses (Kotler, (2002)), and therefore many companies position "market share maximization" as their competition strategy. The more customers there are in the market buying their products, the more they can leverage the power of words of mouth to instill quality standard into consumers, and low purchase risk will attract even more customers.

Becker (1991) asserts that oftentimes we buy a brand at the influence of others' purchase, because more consumers buying it imply that the brand is popular, and nobody wants to be outdated. When there is no other information, customers are susceptible to market share in determining product quality. This is why market share is a frequently used indicator for consumers to tell product quality (McGinnies, (1973)). However, it is hardly reliable to judge product quality by market share solely as products are diverse. Hellofs and Jacobson (1999) points out that product category undoubtedly influences the impact market share has on quality perception. Although businesses presume a higher market share generates more profit, it is not exactly so for high-end products. High-end brands have higher marginal profits than general goods, and it leads to different profit making strategies to treat pricing differentiation in brands. General goods make by volume, whereas high-end brands source other alternatives to mitigate possible negatives brought by increased market share. Take Gucci for example, its reputation deteriorates because of excessive market expansion that hurts its product singularity (Fornell, (1992)). Consumers view a dilemma of low purchase risk but also decreased uniqueness for a product (brand) of high market penetration. Consumer's personal preference plays a considerable role in choosing whether or not to buy a high market share product, especially when the prices are close. For

instance, in car purchase, customers navigate their choice by referencing car brands of cabs running on the street. Brands that are widely purchased are priced lower and more economical in terms of spending, while those that are less popular have relatively higher uniqueness but higher prices and higher emotional utility.

Apparently, moderating variables such as network externality and involvement type of customer exist in market share influence on quality perception. It will be useful to consider these moderating variables in exploring informative effects of market share. In the coming sections, we will first review major theories that this research is built on, secondly expose the research framework for empirical basis, and then explicate research findings and management implications.

2. Quality Perception

Quality perception is ambiguous because consumers are preoccupied with different consumption values and demands for product quality. Some consumers put premium on the feeling a product exerts (e.g. appearance), and some focus on solidity of a product (e.g. practicality or durability). Consumers interpret product quality differently and form an overall value set towards product quality. Zeithmal (1988) defines quality perception as consumer judgment of product superiority as a whole in four aspects: (1) Quality perception is different from physical quality. The so-called objective quality is used to describe a product's physical superiority, but its function does not necessarily apply to the user or consumer. Garivn (1983) says that quality perception is defined on the basis of user (consumer) while objective quality is on the basis of product itself or manufacturer. (2) Quality perception is a high level abstraction instead of a categorization of specific qualities. Many academics support that customers' perception structure of product is scales at levels. The simplest level is product property, and the most complicated level is the perception value customers reflect on a product; product selection is in between. Young & Feigin (1975) use "The Grey Benefit Chain" to explain product property: product → functional benefit → practical benefit → emotional payoff. The highest level is emotional payoff because consumers' emotions are not analyzable by a ready model and thus are regarded the utmost abstract. (3) Quality perception is an overall evaluation, something like attitude. Lutz (1986) diverts quality into two kinds: one is emotional quality and the other perception quality. For emotional

quality, quality perception is the value judgment of product as a whole and is the mediator between preliminary information and eventual estimation of the product. When a customer assumes high product quality, s/he will extend positive attitude towards it, and the opposite if poor quality is assumed. <4> Perception quality is a relative idea. A product is measure as of good or bad quality by the standard of relative superiority that customers have in mind for substitutes. It is noteworthy that product comparison should be consumer-oriented and not manufacturer-driven.

From the above theories of quality perception, we learn that quality perception is consumer- and not manufacturer-centric. Understanding the composites of product property beforehand will facilitate our exploration into how consumers infer product quality. In the first place, Zeithaml (1988) in 1988 categorized the composites of perceptive quality into intrinsic and extrinsic properties. Intrinsic property refers to the natural ingredient of a product (Jacoby, Olson & Haddock; (1971)). For a drink, its intrinsic property includes color and flavor. Extrinsic property is related to the product itself or is an incremental to its added value; examples are price, brand name, advertisement, etc. (Zeithaml, (1988)). Extrinsic property is the most direct product information that consumers receive; consumers may determine quality by such extrinsic info as product fame and advertisement. Three causes lie in such process (Zeithaml, 1988). First, customers have not used the product before or do not use frequently. This is the case for new product adoption – customers cannot know of product efficiency and after-use feelings and thus cannot but judge the product by its extrinsic property. To name a few: how a new launched drink tastes, how durable a new laundry machine is, whether a compact car is user friendly, or if an insurance policy pays off. For new products with no reputation or available after-use information for quality reference, customers tend to resort to extrinsic properties like brand (company reputation), warrant, or packing to make a judgment whether to buy or not. Secondly, customers do not have extra time or interest to study product quality. When consumers are short of time to analyze closely the physical quality of a product, extrinsic property provides a referential alternative. The third cause is impossibility to evaluate intrinsic property. When intrinsic property is out of access, consumers turn to extrinsic properties that are more easily detectable for quality decision.

In 1983 Olson and Reynolds (1983) held that perceptive quality is only an abstraction while product property is concrete. Therefore, when we analyze quality perception, it is necessary to convert abstract quality perception into physical product property so that it makes sense. This research divides product property into intrinsic and extrinsic properties as by Zeithaml's definition in discussing consumers' cognitive differences of quality perception. Zeithaml and Kirmani (1993) indicate that intrinsic and extrinsic properties are inter-influential. Intrinsic property guides customers' recognition of extrinsic property. For instance, different sizes of hi-fi stereo sets denote different prices to consumers. The other way round, product price inspires intrinsic property in customers. Although the influence degrees of intrinsic and extrinsic properties are unclear yet, it is sure that they both play an important role in quality perception.

3. Relationship between Market Share and Quality Perception

In strategy management, many companies believe an enlarged market share will increase company reputation and thus augment profits by economies of scale, enhance competitive advantages, and increase customer's quality perception altogether with. Take Ford Motor Company for example. They provide favorable discount in America to maintain Taurus superiority to Honda Accord and keep number one sales in the market. Yet it is not necessarily true that big market share pertains high quality perception from customer. Hellofs and Jacobson (1999) link customer's brand identity with market share because when a brand has majority market share, customers expect its quality to improve, and quality recognition drops once the expectation is augmented, even though the product quality itself does not change a bit. This is the case for China Telecom, ISP market share leader in Taiwan – its big market share incurs network congestion and user complaints. As a result, it depends on network externality and involvement type of customer to determine whether market share elevates quality perception of customer. Before we move onto involvement type, we will briefly talk about the relationship between market share and network externality.

4. Network Externalities

Externality refers to the situation where a party's economic behavior impacts another party's utility, and we call that this party has externality function over other people (Katz and Shapiro, 1985). Farrell & Saloner (1988) reveal four effects of network externality: (1) improvement of product quality, (2) intensification of ongoing service, (3) reduction of usage cost, and (4) negative effects of congestion. The former three items are effects from positive network externality. The more customers using the same product, the more capital and time its manufacturer is willing to input for quality and service improvement. At the same time, as a result of cost allocation, every end user's usage cost is reduced. The fourth effect is consumptive congestion caused by overpopulated users for the same product. Examples of negative network externality are: people have to line up for car repair if too many request for the service, and emotional utility drops as product uniqueness is diminished. According to Liebowitz & Stephen (1994), utility of products and services mainly comes from satisfaction level provided by the network to users at the usage volume of the very products and services in the same network. Positive externality literally means creating positive utility, when people other than the user himself gain positive effects from the network. In their research on relationship between market share and quality perception, Hellofs and Jacobson (1999) figures that companies can enhance the positive correlation between market share and quality perception through creating positive network externality. Take cost allocation for communication fees, customers who make outbound calls to North America usually enjoy lower rates than those calling for Europe, which is the result of positive network externality. (2) Negative network externality: Negative network externality means people other than the user suffers from negative effects. For instance, too many people on the phone lines or computer network will cause overload to system capacity and result in such negative network externality as quality glitches and congestion to users. Negative externality damages customer's purchasing drive (Hellofs & Jacobson, (1999)), and will furthermore hurt satisfaction level through media communication. Also, Hellofs & Jacobson (1999) believe that negative externality from products and services of high market share decreases quality perception of customer.

5. Involvement Type

Involvement refers to the relevance degree with an event or object that a consumer personally feels against external stimulus in certain context (Houston and Michael, (1978); Zaichkowsky, (1985)). It can also be interpreted as an individual's degree of care for an object (Jonathan, (1964)). In order to reduce purchase risk and increase its payoff value, consumers take measures to rationalize involvement degree. When a consumer's behavior is likely to induce unexpected or unpleasant results, such purchase has risks. Charles & Gareth (1998) name risk as possibly the main reason for involvement. Since involvement is multifaceted and ought not be measured by a single indicator, many researchers abstract various dimensions from involvement by different subjects in discussion. For instance, Houston & Rothschild (1978) clearly structure involvement into tripartite types: context involvement, continuous involvement and reactive involvement. These three types are the essence and source of involvement analysis, and they do not treat involvement object as a central topic. Robertson, Zielinski and Ward (1984) analyze five dimensions of involvement: (1) cost of a product, (2) personal interest, (3) perception of risk in case of wrong purchase, (4) consuming context, and (5) sociability. Laurent and Kapferer (1985) combine diverse theories on product perception to state that involvement cannot be measure by one single indicator. Proven in credibility and validity, by empirical results of 20 products, they conclude five dimensions of rational involvement on the basis of consumer involvement profile: (1) perception of product criticality – how important a product is to a person, (2) perception of negatives from a mistaken purchase – purchase risks that one has to bear, (3) subjective probability of risks from wrong purchase – probability of wrong purchase that consumers assume, (4) hedonistic value of product – psychological value that a product provides, and (5) sign value of product – personal character that a product symbolizes. Vaughn (1980) sorts involvement into two groups: (1) rational involvement: pure analysis of objective cost and efficiency as opposed to emotional attachment, and (2) emotional involvement: subjective emotions towards a product; that is, irrational or emotional relation. Engel, Blackwell and Miniard (2000) extract four dimensions from involvement behavior: (1) degree of relation between product and individual, (2)

risk perception of purchase mistake, (3) degree of relation between customer and purchase result, and (4) degree of anxiety after purchase. This research adopts Vaughn's assortment to divide involvement into rational and emotional involvement types in analyzing the relationship between market share and quality perception. Content of rational and emotional involvement is discussed herewith.

5.1 Rational involvement

Day (1990) defines rational involvement as interest in an object at general level or unity and familiarity an individual feels for an object. Product involvement means that a consumer bases on rationality to evaluate product itself and paid value before or after purchase. It is the degree of understanding that a consumer has about product quality, appearance, function, etc. If the consumer has access to information, its rational involvement will increase accordingly, but the correlation depends upon information integrity (McGinnies, 1973). Rational involvement is more objective and sensible because consumer's concern is product itself and all information has evidence of source.

5.2 Emotional involvement

When a person is stimulated, his emotions, feelings, and mood are all factors to influence him – these factors form affection. Emotional involvement is a more complicated behavior compared with rational involvement. If a consumer buys certain product just for personal preference or others' preferences, it is an emotional involvement. There is no specific inference formula as to the consideration on consumer's mind in such purchase behavior. It may involve context or continuous involvement. Psychological aspect of the individual furthermore complicates the irrationality of emotional involvement.

Park and Young (1983) present three assumptions for emotional involvement: customer's interest in the product, hedonistic value of product, and personal style that the product conveys. Take Hello Kitty fad for example, many manufacturers put forward Hello Kitty accessories such as mobile phone, freezer, motorbike and even automobile. For Hello Kitty fans, they buy these fringe products more or less for the charm. We may view these consumers as group of emotional involvement type since their purchases are initiated to fulfill personal satisfaction. When they

face a line of similar products, they prefer buying the Hello Kitty gadget simply because it echoes their personal preference.

III. FRAMEWORK AND METHODOLOGY OF RESEARCH

1. Research Framework

From theories thereon, the relationship between market share and quality perception of customer is influenced by many other factors. Hellofs and Jacobson (1999) study from the angle of network externality, and this research further includes involvement type of customer. A fundamental thought for this research is to divide customer's quality perception into intrinsic and extrinsic properties. Informative effects of market share will create different perception following different involvement types. Engagement of customer's involvement type carries significant implications to businesses' market share maximization strategy. It is controversial whether companies should maximize market share as product property and market positioning differ.

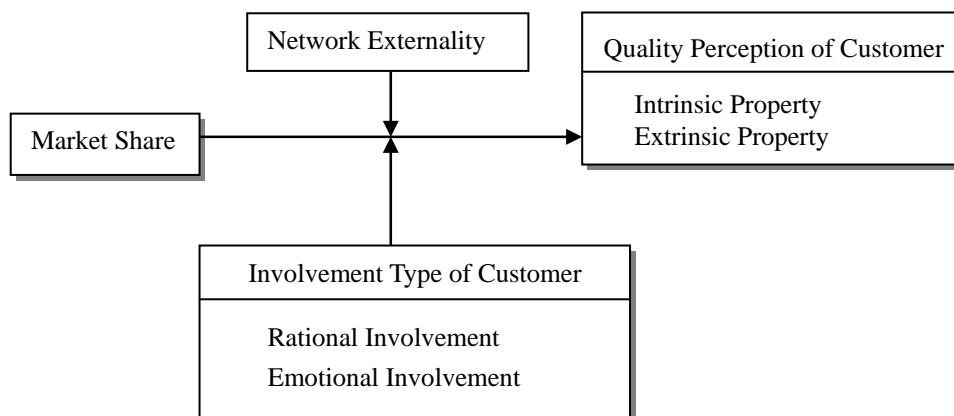Before we address research hypothesis, below is the theoretical framework diagram:

Figure 1.   Research Framework Diagram

2. Research Hypotheses

Hellofs and Jacobson (1999) examine the relationship between market share and quality perception of customer from network externality stance. They discover that market share and customer's quality perception are positively related in conditions of positive network externality and negatively related in conditions of negative network externality. Their proposition is that when a growing number of customers buy certain product, customers benefit from positive advantages such as economies of scale, reduced risk and words of mouth because of increased population for this product. Nevertheless, if too may customers buy the same product to the extent that its market share exceeds certain critical threshold, negative effects such as congestion and diminished uniqueness are born.

In Hellofs and Jacobson (1999) theory, quality perception is a united idea. In other words, it is the overall feeling that a customer holds toward product quality. In fact, Olson, Dover (1979) considers it necessary to understand quality first before venturing to quality perception of customer. In his opinion, the clearest quality property of a product includes intrinsic and extrinsic properties. Zeithaml (1988) agrees that this sorting provides a clearer management content. Because customers have different demands for the same product or service, quality perception of customer is the weighted value of various properties customers evaluate for the product or service. This is why quality perceptions differ from one customer to another (Olshavsky, 1985).

Besides, when a customer makes a purchase decision, in order to minimize perception risk of product quality and enhance the payoff value, s/he will search for product information. Due to the fact that one customer's preference differs from another's, the information each gathers and the how each interprets it differ as well. Involvement is exactly this information searching process for risk mitigation (Charles & Gareth, 1998). Vaughn (1980) classifies involvement into rational and emotional types: the former means the customer focuses on objective cost-efficiency analysis as opposed to emotional attachment, and the latter emphasizes the subjective emotions the customer feels for a product as a subjective preference.

In practice, though high market penetration hurts product singularity, it also decreases purchase risk – different effects speak to different types of customer. Put

in another way, high market share means a larger proportion of the population buys this product. The total purchase utility of customers, through network externality, exerts positive or negative externality following an increasing number of buyers for this product. Positive externality is based on economies of scale, risk mitigation and product reputation. Negative externality is caused by congestion and diminished singularity. For customers of rational involvement type, in conditions of positive externality, degree of positive correlation between market share and quality perception of intrinsic property is higher than that for those of emotional involvement type. This is because the more customers there are buying the product, the more it shows that the product quality is public proven and hence at minimal purchase risk. As a result, customers of rational involvement type relatively have significantly higher quality perceptions than those of emotional involvement. However, degree of positive correlation between market share and quality perception of extrinsic property is obviously lower in customers of rational involvement compared to those of emotional involvement. This is because customers of emotional involvement are inclined to decision-making by product mark and distinction. Thus, their correlation between market share and quality perception of extrinsic property is significantly higher than the rational type's. Based upon the inferences thereon, we assume research hypotheses as follows:

Hypothesis 1: When a product has positive network externality, there is strong positive correlation between market share and intrinsic property to customers of rational involvement type; the correlation is significantly much higher than to customers of emotional involvement type.

Hypothesis 2: When a product has positive network externality, there is strong positive correlation between market share and extrinsic property to customers of emotional involvement type; the correlation is significantly much higher than to customers of rational involvement type.

When a product has negative externality, its market share extends beyond a specific critical threshold so much that overpopulation consuming the product incurs deteriorated utility and negative effects in the form of congestion and

alleviated uniqueness. Hence, for customers of rational involvement type, degree of negative correlation between market share and quality perception of intrinsic property is obviously higher than for customers of emotional involvement type. This is because rational involvement customers prioritize a product's practical value. When too many consumers swarm to use the same product and cause congestion, rational customers have less tolerance for it than emotional ones. In reverse, for extrinsic property of product, over-shopping diminishes product singularity, situation that customers of emotional type cannot stand. As a result, when a product has negative externality, market share and quality perception of extrinsic property are negatively correlated, and the correlation is higher to the emotional involvement group than to the rational group, from which we infer the following hypotheses:

Hypothesis 3: When a product has negative network externality, there is strong negative correlation between market share and intrinsic property to customers of rational involvement type; the correlation is significantly much higher than to customers of emotional involvement type.

Hypothesis 4: When a product has negative network externality, there is strong negative correlation between market share and extrinsic property to customers of emotional involvement type; the correlation is significantly much higher than to customers of rational involvement type.

IV. Method

1. Subject and Scope of Research

In order to validate the hypotheses, the scope of research is set in automobile industry for assessment of its network externality. We issue 300 questionnaires for convenience sampling in northern, central and southern parts of Taiwan to consumers who have car purchase experience. The turnout ratio is 62% with a total of 187 questionnaires turned in. 145 samples in force are concluded after screening out invalid surveys.

2. Measurements

Market share: In the questionnaire, the inquired is asked the current brand he is using now. Market share estimate of such brand is calculated by the brand's share of pie in the observed aggregate. Although the approximate estimate has some gap with real market share, the sample structure is found very close to that of real market with minimal tolerance for error.

Quality perception: Measurement for quality perception is divided into intrinsic and extrinsic properties. The questionnaire is designed with 11 questions to examine intrinsic property of the car and 15 questions for extrinsic property, all scored in 5 scales (scale 1 as not important at all and 5 as extremely important). Total of summed scores evaluates the degree of importance the customer assigns to product property. For the more detail of measurement questionnaire, see Appendix I.

Network externality: There are seven questions in 5 scales designed to inquire about customer's level of agreement. For instance, if too many people buy the product, will the service improve, if more people use the product, it will be more familiar with people. If more people use the product, the manufacture will offer more preferential prices. If more people use the product, it will have better quality. If more people use the product, the manufacture's credibility will increase. The meaning of above subject is to reflect how and to what extent the customer perceives network externality of the product. For the more detail of measurement questionnaire, see Appendix I.

Involvement type: The questionnaire classifies involvement into rational and emotional involvement types, both measured by 5 scales to determine the customer's rational involvement: 1 as strongly disagreed and 5 as strongly agreed. For instance, higher scores in questions pertaining to emotional involvement (purchase is initiated by words of mouth, discount program, or simple fondness, etc.) indicate a higher level of emotional involvement; in contrast, lower scores signify rational involvement. For the more detail of measurement questionnaire, see Appendix I.

3. Measure Assessment

To ensure reliability of each variable in research questionnaire, we first calculate each variable's cronbach α value upon consolidation of completed questionnaires. It is discovered that network externality's cronbach α value is 0.84, and the involvement cronbach α value is 0.92. Each dimension's α satisfies consistency requirement among measured items. The quality perception is concern with two dimensions, therefore, this research use Confirmatory Factor Analysis (CFA) to make further evaluation on its convergent validity and discriminate validity. It is revealed that Goodness of Index (GFI) is 0.91 and Adjusted Goodness of Fit Index (AGFI) 0.82, both showing the research dimensions fit well. In terms of reliability, the composite reliability is 0.97, indicating high reliability of research dimension. To understand the convergent validity and discriminative validity of each dimensional structure, we use t-test for each measured item. The results show that t value of each item is over 2, indicating significant validity level of quantifiable table in the research. Moreover, to clarify the definition of intrinsic and extrinsic property for quality perception in research dimensions, discriminative validity is analyzed by fitness tests of uni-dimensionality and multiple factor structure, as per the instruction of Anderson and Gerbing (1988). Resulted difference of χ^2 shows that multiple factor structure is better than uni-dimensionality for each dimension, signifying discriminative validity between the two dimensionalities as in Table 1.

Table 1.　　Confidence and Compound Confidence Values of Dimensionality

	Number of Items	Cronbach α	CR	GFI	AGFI	t Value	uni-dimensionality		Multiple Factor Structure		$\Delta\chi^2$
							χ^2	d.f.	χ^2	d.f.	
Intrinsic Property	8	0.83	0.83	0.91	0.82	9.99~16.87	70.18	34	198.98	35	128.8***
Extrinsic Property	3	0.89	0.97			17.44~24.51					

Note: "***" p<0.01

V. RESULTS OF EMPIRICAL ANALYSIS

1. Sample Structure

Sampling subject of the research is customer who has purchased automobile. In 145 valid samples, male subject accounts for 95 (72.4%) and female 45 (27.6%). Age distribution is between 25 and 29 in majority (35.1%). For education background, graduate school accounts for the most (31.7%) and secondarily university (26.2%). For profession, military, government and education sector occupies the largest share (33.1%) and service industry (25.5%) secondarily. Personal income mostly falls in between NT$ 20 to 40K (40%). For marital status, married takes up for 50.4% (see Table 2).

Table 2.   Descriptive Statistics of Questionnaire Variables

Research variable	Sex		Age							Marital Status	
	Male	Female	Below 24	25-29	30-34	35-39	40-44	45-49	Above 50	Single	Married
Number	95	45	11	51	27	27	13	7	9	72	73
Percentage	72.4	27.6	7.6	35.1	18.6	18.6	9	4.8	6.3	49.6	50.4

2. Cluster Analysis

In order to comprehend the impact of customer involvement type on the relationship between market share and quality perception, we perform cluster analysis on the two moderating variables: involvement type and network externality. By use of non-hierarchical K-Means of cluster analysis, we classify involvement type into two clusters: rational involvement oriented and emotional involvement oriented clusters. After clustering tests, it is ascertained that both clusters are test-certified (Table 3) with minimal residual matrix value, which indicates proper clustering with significant variation between clusters and little variation within each cluster. To further certify integrity of the clustering result, Discriminate Analysis is carried out to validate discriminative ratio at 97.93%.

Table 3.　　Cluster Ratio of Involvement Type for Automobile Industry

	Rational Involvement Oriented	Emotional Involvement Oriented	$Wilk's\Lambda$	F	P
Number	42	55	0.19834	87.8	P<0.01
Discriminative Ratio	95.3488	98.1481			

To examine the moderating role of network externality by regression analysis, this research split sample into two conditions: one is positive and the other negative network externality.

As for network externality, we first conduct exploratory factor analysis of questionnaire items and extract two factors from the original six items for further cluster analysis. Network externality is classes into two clusters, respectively positive and negative network externality. Cluster analysis shows that the main and total effects of both clusters are above significance level (Table 4), and the discriminative ratio is as high as 97% – a fair result for discriminative effect of network externality.

Table 4.　　Cluster Ratio of Network Externality for Automobile Industry

	Positive Network Externality	Negative Network Externality	Wilk's lambda	F	P
Number	68	77	0.34354	43.95	P<0.01
Discriminative Ratio	97.91	98.684			

3. Impact of Market Share on Quality Perception of Product - Moderating Role of Network Externality

We analyze involvement type of customer and by dummy variables. I=1 denotes emotional involvement type, and I=0 rational involvement type. In terms of network externality, in order to compare with the research made by Hellof & Jacobson (1999), this article divides network externality into two groups by median, and implement hierarchical regression analysis, respectively.

In terms of network externality, we use residual analysis to figure out abnormalities within raw data. Observed value that skews from the mean by ±3 standard deviation is regarded as an abnormality in raw data. Regression analysis is rendered after deletion of abnormalities. This research makes further test on

whether residual value is normal distribution or not through Shapiro-Wilks statistics, and the test result is W=0.983 (p=0.1753), conform to Normal Distribution. Furthermore, this research use VIF to test multicollinearity, and the VIF value is lower than 10, therefore, multicollinearity is not a serious problem. The result of hierarchical regression analysis is listed in the following table 5:

In table 5, variables of hierarchical regression analysis are intrinsic and extrinsic properties of quality perception, and the independent variables are plugged into the model by four steps. To simplify the data, we list only end results here. Step 1 inputs control variables, six in total including sex, education background, age, monthly income, marital status, and profession. Both regression equations attain significance level (R2 is respectively 0.423 and 0.393). Male's perception of intrinsic property is higher than female's, but there is no sex difference for extrinsic property. People of higher education background have higher perceptions of intrinsic property over those of lower education background, but no difference between the two for extrinsic property. Under age, profession and monthly income variables, we detect no significant difference for perceptions of either intrinsic or extrinsic property. Married subjects show significantly lower perceptions of intrinsic property than single ones, and their perceptions of extrinsic property are negative as well but are yet to attain significance level in statistics.

Step 2 inputs main effects and moderating variables such as market share and involvement type. Explanatory increments for effect interpretation attain significance level (ΔR2 is respectively 0.252* and 0.271*), where market share is positively correlated with intrinsic and extrinsic properties separately at significance level (β =0.306* and β =0.261*).

In other words, the bigger the market share becomes, the higher the quality perception of customer (for intrinsic and extrinsic properties) develops.

Step 3 inputs interaction. In regression model of intrinsic property, market share times involvement (MS×I) gets negative interaction (β =-0.118*), which denotes negative intensification. In main effects, the higher the market share is, the higher quality perception of intrinsic property becomes, so that emotional involvement customers feel a lower positive correlation between market share and quality perception of intrinsic property than rational type customers do. That is to say, when a product has positive network externality, market share and intrinsic

property are by force positively correlated for rational involvement customers, and the correlation is significantly stronger than for emotional involvement customers. Empirical results support our research Hypothesis 1.

Table 5.　Result of Hierarchical Regression Analysis
for Positive Network Externality

Dependent Variable / Independent Variables	Intrinsic Property	Extrinsic Property
Step1		
Control Variable		
Sex (X_1)	0.141*	0.184
Education Background (X_2)	0.323*	0.156
Age (X_3)	0.264	0.413
Monthly Income (X_4)	-0.312	-0.264
Marital Status (X_5)	-0.828*	-0.312
Profession (X_6)	-0.112	0.482
ΔR^2	0.423*	0.393*
Step2		
Market Share (MS)	0.306*	0.261*
Involvement Type (I)	0.323	0.214
ΔR^2	0.252*	0.271*
Step3		
Market Share $\times$ Involvement (MS$\times$I)	-0.118*	0.284*
ΔR^2	0.242*	0.221*

Note: '*' $p<0.05$

In regression model of extrinsic property, interaction of market share times involvement (MS×I) is positive ($\beta = 0.284$*), so the intensification effect is positive. The main effect reveals that the higher the market share is, the higher quality perception of extrinsic property becomes. Thus, to emotional involvement customers, positive correlation between market share and quality perception of extrinsic property is significantly higher than that to rational customers. Empirical results echo research Hypothesis 2.

In terms of negative network externality, This research makes further test on whether residual value is normal distribution or not through Shapiro-Wilks statistics, and the test result is W=0.872 (p=0.1025), conform to Normal

Distribution. Furthermore, this research use VIF to test multicollinearity, and the VIF value is lower than 10, therefore, multicollinearity is not a serious problem. The result of hierarchical regression analysis is listed in the following table 6:

Table 6.   Results of Hierarchical Regression Analysis for Positive Network Externality

Dependent Variable / Alternative Variable	Intrinsic Property	Extrinsic Property
Step1		
Control Variable		
Sex (X_1)	0.241*	-0.331
Education Background (X_2)	0.434*	-0.328
Age (X_3)	0.129	0.236
Monthly Income (X_4)	0.292*	0.398*
Marital Status (X_5)	-0.132	0.203
Profession (X_6)	-0.111*	-0.188
R^2	0.249*	0.292*
Step2		
Market Share (MS)	-0.214*	-0.254*
Involvement Type (I)	0.228	-0.243
ΔR^2	0.232*	0.221*
Step3		
Market Share $\times$ Involvement (MS$\times$I)	-0.218*	-0.232*
ΔR^2	0.245	0.161

Note: '*' $p<0.05$

In Table 6, variables of hierarchical regression analysis are intrinsic and extrinsic properties of quality perception, and the alternate variable is inserted into the model by four steps. To simplify the data, we list only end results. Step 1 inputs control variables, six of them including sex, education background, age, monthly income, marital status, and profession. Both regression equations attain significance level (R^2 is respectively 0.232* and 0.292*). Male's perception of intrinsic property is higher than female's, but there is no sex difference for extrinsic property. Subjects of higher education background have significantly higher perceptions of intrinsic property as opposed to those of lower education background, but there is no difference between the two for extrinsic property.

Subjects earning higher monthly salary have higher perceptions of both intrinsic and extrinsic properties than those earning lower income do. In terms of age and profession, there is no significant difference in perceptions of intrinsic or extrinsic property. Married subjects show significantly lower perceptions of intrinsic property than single ones, and their perceptions of extrinsic property are negative as well but have not reached significance level in statistics. Step 2 inputs main effects and moderating variables such as market share and involvement type. Explanatory increments for effect interpretation attain significance level ($\triangle R^2$ is respectively 0.232* and 0.221*), where market share is negatively correlated with intrinsic and extrinsic properties separately at significance level (β = -0.214* and β = -0.254*). In other words, in conditions of negative network externality, bigger market share results in lower quality perception of customer (for intrinsic and extrinsic properties). Step 3 inserts interaction. In regression model of intrinsic property, market share times involvement (MS×I) gets negative interaction (β = -0.218*), which signifies negative intensification. In main effects, the higher the market share is, the lower quality perception of intrinsic property becomes, so that emotional involvement customers feel a significantly higher negative correlation between market share and quality perception of intrinsic property than rational type customers do. In other words, the result refutes Hypothesis 3 – when a product has negative network externality, there is strong negative correlation between market share and intrinsic property to customers of rational involvement type; the correlation is significantly much higher than to customers of emotional involvement type.

In regression model of extrinsic property, interaction of market share times involvement (MS×I) is negative (β = -0.223＊), so the intensification effect is negative. The main effect tells that the higher the market share is, the lower the quality perception of extrinsic property becomes. Thus, to emotional involvement customers, negative correlation between market share and quality perception of extrinsic property is significantly higher than that to rational customers. Empirical results support research Hypothesis 4.

VI. CONCLUSION AND MANAGERIAL IMPLICATIONS

According to empirical results of the research, the relationship between market share and quality perception of customer depends on network externality and involvement type of customer. When a product has positive network externality, regardless of rational or emotional type customers, market share and intrinsic and extrinsic properties of product are positively correlated. Yet for rational customers, the relationship between market share and perception of intrinsic property is significantly higher than for emotional customers. On the other hand, emotional customers identify significantly higher relationship between market share and perception of extrinsic property than rational customers do. Analytical results thereon validate the research hypotheses. When a product has negative network externality, emotional customers identify a significantly higher negative correlation between market share and perception of intrinsic property than rational customers do. This result rejects Hypothesis 3. Rational customers detect a significantly higher negative correlation between market share and quality perception of intrinsic property than emotional customers do. Empirical results support research Hypothesis 4.

It is intriguing that only Hypothesis 3 is rejected. An initial expectation is that in conditions of negative network externality, rational customers will be less bearable than emotional ones towards negative effects like congestion. Nonetheless, empirical data ends up that emotional customers' perception of intrinsic property against negative externality is much lower than that of rational customers. An inferential cause is that emotional customers pay attention to singularity and style, and therefore under negative network externality, their perceptions of either extrinsic or intrinsic properties decrease by all means when market share goes up.

The research results further extend findings of Hellofs and Jacobson (1999). Hellofs and Jacobson (1999) focus on the effects of market share on customer's quality perception, and hold network externality as a disturbance factor. Results show that in conditions of positive externality, market share and quality perception are positively correlated while in conditions of negative externality, they are negatively correlated.

The major difference between this research and that of Hellofs and Jacobson lies in the engagement of customer's involvement type into model for discussion. We'd like to summarize the management implications suggested by research results:

1. Necessity to consider network externality in employing market share maximization strategy

Market share expansion is a common strategy that companies practice from marketing theory in an attempt to enhance competitive edges. For companies, bigger market share implies more control power over the market. Henceforth, market share becomes a crucial indicator for business performance, and companies oftentimes employ market share maximization as their competition strategy. However, this research reveals from empirical study in automobile industry that in conditions of negative network externality, customers' quality perception drops as market share flies high.

2. Necessity to consider product characteristics before expansion of market share

It is shown that under positive or negative network externality, different types of customers perceive quality differently in conjunction with intrinsic and extrinsic properties of product. In other words, if a product claims by functionality, in conditions of positive network, it calls to rational customers more effectively because their perceptions of intrinsic property augment as market share grows, as they feel a stronger positive correlation than emotional customers do. In contrary, if the product is marketed by image, it appeals to emotional customers more because their perceptions of extrinsic property are positively correlated to market share, and the correlation is significantly higher than rational customers can tell.

3. In market over-expansion periods (i.e. negative network externality), emotional customers express negative feelings more aggressively than rational customers do

　　Despite perceptions of either intrinsic or extrinsic property, in conditions of negative network externality, emotional customers take negative effects more seriously than rational customers do. If a company over-expands its market share to the extent that emotional customers choose to desert its products, especially products marketed by image, the company will hardly gain any profits from such market penetration strategy.

　　This research instills involvement type of customer into study of network externality and provides implications to businesses, which face different strategic concerns in operating market share maximization strategy. We may say the study of Hellofs and Jacobson (1999) is furthered by this research. However, empirical results negate Hypothesis 3, for which we infer two possible causes: (1) The research scope is automobile industry, where faddishness might appear weak to emotional customer cluster. Automobile is a high involvement product, and generally speaking, consumers will think twice before making such purchase and thus personal preference is rarely a key determinant. If network externality is negative, quality perception of emotional customers will be even lower based on their preference orientation. We suggest future research fellows to consider two industries for comparative analysis so as to control possible bias from high or low involvement product types. (2) In theoretical analysis, it is brought up that Zeithaml and Kirmani (1993) mention about possible interactions between intrinsic and extrinsic properties. We welcome future studies to address the interaction by LISREL model and further this research.

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APPENDIX I

Quality Perception

1.Engine horsepower

2.Brake system

3.Gas consumption

4.Plate metal strength

5.Acceleration

6.Driver and operational convenience

7.Stability while drives a vehicle

8.Interior seat space

9.Anti-lock Brake System

10.Air bag

11.Automatic adjustment seat

12.Aluminium alloy wheel rim

13.Chassis structure

14.Brand public praise

15.Brand image

16.Brand Awareness

17.Price reasonable or within the range of affordable capability

18.Zero interest rate of special case

19.Commercial persuasion

20.Advertising agent

21.Mass media advertisement frequency

22.Suitable for one's status or position

23.Show-off or let others envy

24.To show personal style

25.Salesman's service attitude

26.Maintenance and repair expenses

Network externality

1.If more and more people use the same style of sedan, I will be happier.

2.If more and more people use the same style of sedan, I believe that the fame of this style of sedan will be enhanced.

3.If more and more people use the same style of sedan, I feel that manufacturer can have more preferential price (such as preferential loan).

4.If more and more people use the same style of sedan, I feel that the function of this style of automobile will be much better…

5.If more and more people use the same style of sedan, I feel that I will have

more honors.

6.If more and more people use the same style of sedan, I believe that the reputation of its manufacturer will be enhanced.

7.If more and more people use the same style of sedan, I believe that the service of its manufacturer can be even much better.

Involvement type

1.Before I choose to purchase an automobile, I will collect the data of various marketing professional of the automobile.

2.I am quite clear about the professional jargon of the automobile.

3.The reason why I choose the sedan that I am using right now is because the interior structure of the car itself let me feel that it is worthy of the purchase.

4.The reason why I choose the sedan that I am using right now is because I have once compared with the same style of automobile in its quality and controllability etc. in depth.

5.Before I choose to purchase the sedan that I am using right now, I have once made reference to the critic on the magazine with regards to various type of sedan.

6.The reason why I choose the sedan that I am using right now is because it has very good public praise.

7.The reason why I choose the sedan that I am using right now is because I believe it can show fore my personality.

8.The reason why I choose the sedan that I am using right now is purely because I like its style.

9.The reason why I choose the sedan that I am using right now is because of its uniqueness.

10.I choose the sedan that I am using right now is purely based on instincts, namely I like it.

從網路外部性與消費者涉入類型觀點探討市場佔有率與消費者品質知覺關係之研究

廖國鋒・朱宗緯・李堯賢[*]

摘要

　　本研究的目的是從網路外部性和消費者涉入類型差異的觀點，探討市場佔有率和品質知覺間的關係。依據 Hellofs and Jacobson（1999）的研究，市場佔有率與消費者品質知覺間的關係受網路外部性的干擾影響，當產品具有正面網路外部性時，市場佔有率和品質知覺為正向關係，反之則為負向關係，在多數文獻支持市場佔有率與消費者品質認知為正相關的前提下，若將網路外部性和涉入類型同時納入考量，其結果是否一致，是本研究所關切的議題。另外消費者對產品品質的認知是否會因產品的不同屬性而有不同的見解，因此本研究試圖從網路外部性與涉入程度類型的觀點，建立其研究架構，以探究市場佔有率與品質知覺的關係程度。而研究結果發現，當產品存在正面網路外部性時，不同涉入類型的消費者對於市場佔有率與品質認知的結論與 Hellofs and Jacobson（1999）相同，但是在網路外部性為正面或負面網路外部性的情形下，不同涉入型態的消費者對內隱屬性以及外顯屬性品質知覺不同，本研究結果除了擴大 Hellofs and Jacobson（1999）的論點外，對於市場佔有率與品質知覺的關係提出新的見解。

關鍵詞彙：網路外部性，涉入類型，品質知覺

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