

FACTORS INFLUENCING CONSUMERS' INTENTION TO ADOPT NATURAL GAS FOR VEHICLE IN BANGKOK

By Ms. Piyathida Sangruji

A Research Report for MS 7000: Research Project Submitted in Partial Fulfillment of the Requirement for the Degree of Master of Science in Management

August 2007

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FACTORS INFLUENCING CONSUMERS' INTENTION TO ADOPT NATURAL GAS FOR VEHICLE IN BANGKOK

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ABSTRACT

The objectives of this study were (1) to investigate the relationships between attitude factors influencing and consumers intention toward adoption of Natural Gas for Vehicle (NGV), and (2) to determine the relationship between subjective norms factors and consumers intention toward adoption of NGV.

This is a survey research. The samples were 200 respondents using sampling technique. The researcher used questionnaires relating objectives of the study to gather information from respondents. Data analysis was carried out using the Statistical Package for Social Sciences (SPSS) program. The two procedures used in this study were Descriptive analysis and Pearson's Correlation Coefficient, which used to test the hypothesis.

It was found that (1) perceived product benefit, perceived cost advantage, NGV filling convenient, awareness of promotion and campaign, social influence and secondary sources factors have low influence towards the adoption of NGV; (2) respondents have low awareness towards NGV; and (3) most of them are not sure to use NGV in next six months.

Key Words: Natural Gas for Vehicle (NGV), Attitude, Subjective Norms, and Pearson's Correlation

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CHAPTER 1

INTRODUCTION

1. Background of Study

For the past few years, Thailand's economic performance has been doing well, with the average growth rate of more than 6 % per annual. This has led to growth in energy consumption. In 2006 our demand for primary commercial energy increased by 7.6% while our energy production showed an increase of only 4 %. As such we have witnessed at present, a larger growth of deficit in energy production caused by imported oil (www.eppo.go.th).

Figure 1.1 Demand of Natural Gas and Oil Consumption. [Natural Gas (left) and Oil Production Imports (right)]



Source: Thailand-An Energy Case Study, by Dave, June 15, 2006, www.theoildrum.com

To remedy the situation and sustain the level of our economic development it is essential to put a limit on impacts from increasing oil price. This means Thailand has to put re-doubled efforts in energy conservation campaign together with the promotion of alternative fuels, such as Ethanol (Gasohol), Bio-diesel and Natural Gas for Vehicle (NGV). At present, Ethanol program is quite successful as proved by the increase in the demand for Ethanol-blended gasoline or GASOHOL (E10). The current consumption rate of 2.7 million liter per day of GASOHOL, coupled with a strong and continuous campaign of energy savings and conservation has helped Thailand reduce overall oil importation by almost 10% on year-to-year basis (www.eppo.go.th).

Another measure recently introduced is by means of using Natural Gas in the transportation sector. NGV is the best way of utilizing Thailand's domestic natural gas resources in the transportation sector, because it can substitute 100% of imported oil. With rising oil price, more and more taxi, public buses, and trucking fleet, will be encouraged to convert to use NGV to help Thailand save on energy expense. Our national oil company, PTT Public Company Limited (PTT), following the government policy on conservation of energy invests in building and expanding NGV stations and infrastructure to service more NGV customers. Currently, there are about 70 NGV stations in Thailand, and most of them are located in Bangkok, PTT aimed to increase the number of its NGV stations to 200 at the end of 2006. It is estimated that the number will rise to 740 by 2010 (www.thailand.prd.go.th).

NGV is generally promoted to reduce the problem of air pollution in Bangkok area. The pollution in Thailand is caused mainly by the emission from the industries and mobile sources (vehicles). Due to the fact that Bangkok being the center for commercial and government as well as the industries, the air pollution becomes unavoidable and rather in a chronic state. The vehicles are, of course, blamed for deterioration of the situation. Although the exhaust emission control measures applicable to stationary

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pollution sources such as factories have marked considerable progress but in spite of efforts to control exhaust gas emission from automobiles have also advanced to a certain state the fact remains that the environmental standards especially particular matter are not being taken cared of in most roads in Bangkok. In spite of the advanced technology in diesel engine, particular matter still remains the significant pollutant in the exhaust gas and with such a high consumption of diesel the amount of particular matter emission can be at an alarming level. The alleviation of particular matter exhaust emission can easily be accomplished by using NGV as the alternative fuel for diesel. The reason is that the combustion of NGV does not create particular matter. It is not only the level of particular matter not being met by the environmental standard but also the level of carbon monoxide (CO) in many roads in Bangkok is way higher than the normal stand. CO is mainly caused by the incomplete combustion of gasoline in light-duty vehicle engines. The control of CO emission can easily be accomplished by substituting gasoline with NGV, which is potentially a cleaner burning fuel than gasoline (Chai-Anun and Boonchanta, 2004).

NGV Development in Thailand SINCE 1969 Source: http://pttinternet.pttplc.com

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1984

NGV made its debut in Thailand in 1984 when a number of Bangkok buses, taxi and "tuk-tuk" underwent the NGV experimental program. Technically speaking, the experiment was a success with satisfactory engine performance being noted. However, the lower cost of motor fuels and the high costs of modifying engines to NGV fuelling at that time made the program not economical. 1993

In 1993, the Anand Panyarachun Administration's policy in addressing the air pollution problems revived the interest in NGV. Funding supports were granted to the Bangkok Mass Transit Authority (BMTA) to acquire 82 NGV buses and the country's first NGV service station being built by PTT at BMTA's Rangsit depot in northern outskirt of Bangkok.

1999

In 1999, PTT embarked on another trial, modifying 12 petrol engine cars and 16 diesel engine vehicles into oil/gas bi-fuelling. Again, the results were satisfactory.

2000

A larger NGV test program was launched a year later when PTT sponsored the costs of conversion 100 city taxis into oil/NGV burning vehicles. The success led PTT to start a pilot project by PTT bearing the cost of changing 1,000 taxies into NGV powered cars. In parallel, PTT has started building NGV service stations in Bangkok and adjoining areas.

Future of NGV in Thailand

In a continuation process, PTT Public Company Limited went on with its nationwide campaign to promote the use of NGV in vehicles. For example, PTT's project to construct the gas pipeline around Bangkok was to be completed in the third quarter 2006. PTT had also expanded the campaign period, to encourage drivers to convert to NGV equipment at special prices. The price for NGV as a substitute energy source is only Bt8.50/kg. PTT aims to establish more NGV service stations to be accomplished up to

740 stations in year 2010, with the strong belief that the campaign for the use of NGV will be successful (http://thailand.prd.go.th).

PTT goes further to invite the public to participate in a campaign to convert vehicle engines to NGV. The company offers to subsidize the conversion cost at the rate of Baht 10, 000 per vehicle. That means owners of four-cylinder vehicles would spend Baht 25,000 to Baht 53,000 to convert their car engines to NGV. At present it may seem like a high investment on the conversion process, but the result will show a 70 per cent decrease in fuel cost when compared to regular petrol. The Board of Investment (BOI) also supports the use of NGV by offering promotional privilege to NGV engine production projects. These investors are entitled to a privilege of import duty exemption up to eight years for the import of NGV related machines. This BOI-privilege entitlement applied to service stations in all areas is also NGV in the country. (http://thailand.prd.go.th). BROTHE GABRIE

General Information on NGV/NGV Components

The main component of Natural gas for vehicle or NGV is methane. In its natural form, NGV is colorless, odorless, and lighter than air. Its quality is to provide complete and clean burning in the engines with lower level of emission than other fossil fuels and possessing 130 octane number. It is known as an economical, safe, environmentally friendly fuel for vehicles. For these reasons, NGV has become more popular and acceptable throughout the world.

Type of NGV Engines

Source: http://pttinternet.pttplc.com

There are two types as follows:

- Dedicated NGV or the dedicated natural gas vehicle which operates using only natural gas. A vehicle that operates only on natural gas ("dedicated vehicle") can optimize a full advantage of high octane inherent in natural gas. In this case the fuel is used more efficiently. A dedicated vehicle only operates on one fuel.
- Dedicated NGV or the dedicated natural gas vehicle which operates using two separate fuel systems.
 - 2.1 *Bi-fuel* is a vehicle with two separate fuel systems designed to run on either an alternative fuel or a conventional fuel using only one fuel at a time, generally gasoline and/or natural gas. "Bi-fuel vehicles" are gasoline vehicles converted to bi-fuel operation by adding natural gas fuel storage, pressure regulation and control systems.
 - 2.2 Diesel Dual Fuel is a vehicle designed to operate on some combination of both an alternative fuel and conventional fuel at the same time. Dual-fuel vehicles have two separate fuel systems. A duel-fuel vehicle can also operate on one fuel or the other.

2. Research Problem

Basically, the main problem is the current limited number of NGV service stations. PTT needs to urgently expand the NGV service stations to cover more areas in order to serve NGV consumers' need. PTT realizes this problem that their campaign need to stress on the increased number of NGV service stations before it can achieve to attract more of non-NGV users to convert their vehicle engines. (http://thailand.prd.go.th). However, not only the number of NGV service stations needs to be increased, but there are also some factors influencing vehicle owners to accept to convert to use NGV and these need to be clarified. There are many explanations for lack of progress on the development and use of NGV (Duann and Hegazy, 1992). Duann and Hegazy argued that one of the reasons of lack of development progress and use of NGV can be viewed as a result from the cost and benefits perceived by individual vehicle owners. Thus, researcher is interested in finding out *what factors influencing consumer's intention to use NGV*.

3. Research Objectives

This study has four main objectives as follows:

- 1. To determine the awareness, and perception of respondents towards NGV
- 2. To identify the relationships between attitude factors influencing and consumers intention towards adoption of NGV.
- 3. To identify the relationship between subjective norms factors and consumers intention towards adoption of NGV.
- 4. To determine the respondents' intention to use NGV in next six months

4. Research Questions

- 1. What are the awareness, and perception of respondents towards NGV?
- 2. What is the relationship between attitude factors and consumer intention towards the adoption of NGV?
- 3. What is the relationship between subjective norms and consumer intention towards the adoption of NGV?

4. What is the respondents' intention to use NGV in next six months?

5. Scope of the Research

The purpose of this research is to find out the factors that influence consumer intention toward NGV in Bangkok area by studying demographics, attitudes, and subjective norms. This study employed a survey method by distributing questionnaires to collect information. The sample of this study was drawn from people aged 21-55 years old who are NGV-non users.

6. Significance of Study

The research is to investigate consumer attitude and subjective norms factors towards his/her intention to use NGV in Bangkok area. The results of the research can be implemented to improve and develop NGV programs by the related sectors both government and private sectors in order to accomplish NGV expansion in Thailand. In addition, it would be useful to improve NGV fuel vehicles efficiency so that NGV vehicle can compete with gasoline vehicle without too many defects.

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7. Definition of Terms

Source: http://www.ngv.org

Alternative Fuel: A fuel that can be used to substitute traditional vehicular fuels such as gasoline or diesel. Alternative fuels include natural gas (compressed and liquefied), propane (LPG), hydrogen, biomass-derived fuels, alcohol (including ethanol and methanol), alcohol mixtures with gasoline or other fuels, electricity, or any other fuel determined to be substantially not petroleum and yielding substantial energy security and environmental benefits.

Dual-Fuel Vehicle: A vehicle designed to operate on some combination of both an alternative fuel and conventional fuel at the same time. Dual-fuel vehicles have two separate fuel systems, but a duel-fuel vehicle can also operate on one fuel or the other.

Greenhouse Effect: A term used to describe the roles of water vapor, carbon dioxide, and other trace gases causing the earth surface warmer that it would be otherwise. These radiatively active gases are relatively transparent to incoming short-wave radiation, but are relatively opaque ("blocking") to outgoing long wave radiation. The "greenhouse" gases within the lower levels of the atmosphere trap the long wave radiation, which would otherwise escape to space, causing re-radiation of some of the energy back to Earth. This leads to a higher temperature of the earth surface than if the gases were absent.

Heavy-Duty Vehicle: Vehicle such as a truck with the weight between 26,001 to 33,001 lbs.

Light-Duty Vehicle: The size of the engine has traditionally been used to differentiate between light, and heavy-duty. But this study will expand to include vehicles regardless of horsepower that are not used in regular production cycles. In other words, all vehicles except higher horsepower units involved in ore, waste or fill handling (trucks and scoop trams) will be considered light-duty vehicles.

Natural Gas for Vehicle: Compressed natural gas (CNG) or, less commonly, liquefied natural gas (LNG)) as a clean alternative to other automobile fuels.

8. Limitations of the Study

- The spatial area of the research is limited to cover only in Bangkok area and the sample size of this study is 200 samples by convenient method. Thus, this cannot be generalized to respondents in other areas of Thailand.
- 2. The research is based on survey of respondents who use light duty vehicles; sedan type. Therefore it cannot be generalized to respondents who use heavy duty vehicle; truck, bus and van.
- 3. Even though different kinds of alternative fuels such as natural gas, electricity, and gasohol can be used to power motor vehicles, but this study concentrates only on consumer intention toward NGV.
- 4. The research focuses on consumer attitude and subjective norms factors influencing intention to use NGV. It does not involve technical, environmental, economic, and regulatory issues.

9. Summary

Thailand, like many other countries, is having trouble to cope with higher energy prices and air pollution. She is striving with the best strategies available to sustain economic growth in the face of rising fuel costs. Energy saving and the promotion of the use of alternative energy have been raised to cope with higher oil price worldwide. NGV is an alternative fuel in which government and PTT Public Company Limited have cooperated to set attractive NGV price structure to accelerate the NGV utilization.

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However, there are many factors that could contribute to a successful development of the campaign and understanding consumer's behavior is one of the key success factors.

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CHAPTER 2

REVIEW OF RELATED LITERATURE

This part of study will discuss on some general concepts, which provides readers with an idea of consumer attitude, and behavior relationship, and other factors that influence consumers' intention. Furthermore, the factors that play a role in the public perception of natural gas for vehicles as an alternative fuel for vehicles will also be discussed. This section reviews similar researches or literatures that are considered relevant for the introduction adoption of NGV such as risk perception and trust and consumer behavior in relation to environment issues. The conclusion of this review is based on a discussion on the major psychological mechanisms that play a major role in the public acceptance of energy system.

1. Literatures and Related Studies

1.1 Consumer Attitude

Darwin defined attitude as a motor concept, or the physical expression of an emotion (Darwin, 1872). Hovland (1950 and 1960) described that attitude could be changed through persuasion and response to communication. Behavioral researchers have explored the screening of the role of attitudes. It is included the attitudes are a combination of emotional responses and beliefs about a product (Ulberg, 1989). Further more attitudes function on the level of whole product properties in contrast to the attribute level. Here preferences are conceived as stable, attitudes are changeable (Turrentine and Sperling, 1992).

The function between beliefs and feelings can change consumers' consideration of a product. If beliefs and emotional response are consonant, then the attitude and therefore preference is relatively stable. If there is dissonance; if beliefs conflict with affect, the attitude is not stable and may lead to preference change. This is when new information can stimulate change (Turrentine and Sperling, 1992).

A person's attitude is very important and it is based on how much experience the person has had before making the decision. If the person has had a direct experience which relates to the decision that is being pondered at this moment then his/her attitude will have a much stronger affect on the outcome behavior than if the person has never had any experience and only based the decision on indirect experiences alone. These direct experiences come to mind faster than indirect experiences (television advertisements, advice from a colleague) which makes the decision more routine and acceptable because the person has dealt with a related decision like this in the past (Fazio and Powell, 1989).

Attitude researchers evaluated consumer responses to new products using hypothetical situations much like stated preference work. Measurements have been based upon several popular models such as Fishbein and Ajzen's (Addison-Wesley, 1975; Rosenberg, 1956; McAlister, 1982). These attitude models have mixed results in predicting purchases. Attitudes predict best for products in which feeling are more important-desirable, risky purchase with uncertain outcomes (Davidson and Morrison, 1982). Darwin (1872) defined the link between attitude and behavior that it exists but depends on attitude specificity, attitude relevance, personality, constraints and timing of measurement. Several things have their roles to build up an attitude to cause a behavior (www.wikipedia.com), But many other researchers reported similar findings that the attitudes do not predict behavior even when measured under optimal conditions (Wicker, 1969).

1.1.1 Attitude-Behavior Variables

Fazio and Zanna (1981) explained that "Rather than asking whether attitudes relate to behavior, we have to ask" Under what conditions do what kinds of attitudes or what kinds of individuals predict what kinds of behavior?...We need to treat the strength of the attitude-behavior relationship as we would treat any other dependent variable and determine what factors affect it (Fazio and Zanna, 1981).

Several studies have been undertaken to test the theory that attitudes directly affect behavior. Out of these studies, a number of factors have emerged that help determine the amount an attitude influences a person's behavior, including situational qualities and personal qualities (www.ciadvertising.org).

1.1.2 Situational Qualities

The situation in which an attitude to behavior relationship exists may be the strongest influence of all as this can show the strength or weakness of the relationship. The first variable involved is the "norms" of society in which that person believes. It is how a person should act in a certain situation deemed appropriate by his/her society. This is one main obstacle that constrains the attitude to behavior relationship by not allowing people to act as they would like. Instead they react in accordance to a set of societal rules. The "norms" has been a major part of the attitude to behavior relationship which was originally expressed in the Theory of Reasoned Action Model. The influence of societal "norms" decreases the accuracy of attitudes predicting behavior (www.ciadvertising.org).

Besides "norms" how much vested interest the person has in the decision-making determines how much the attitude will affect behavior. The more vested interests the person has in the decision-making, being a major decision, the stronger attitude will affect behavior. (Fazio and Powell, 1989).

Finally, time is a major variable that goes along with vested interest in the attitude behavior relationship. The less time there is to make a decision the more attitude influenced behavior appears. This attitude was drawn from past experience or outside sources that is the only factor in making the decision. There is no time to deliberate over one consequence or another from a person's actions when one is pressed with to make a decision. Another factor that strengthens the argument that the less time there is the more attitudes drawn into making a decision, revolves around situational objects at the time of the decision. Many times if there is little time needed to make a decision then it is a high priority decision and situational objects will help guide the decision. Examples of these are product packaging or an item that is on sale for that day. While if there is a lot of time in weighing the decision attitude will matter less because more outside sources will come in to play in making the final choice. (Fazio and Powelf, 1989).

1.1.3 Personal Qualities

The influence of the overall person's character is also a major factor in how much attitude relates to a direct behavior. The more a person is inner motivated and makes independent decisions without the aid of outside sources will show a strong attitude to behavior relationship. Contrary to that, a person who is affected more by outside sources or cues will likely have a weak attitude to behavior relationship. This is the case in which "norms" of society often comes into play. For example, a teenager who wants a certain pair of jeans so she can be considered in the "cool" crowd of her junior high even though she knows the only difference in the brand she currently owns is the higher cost of the new brand preferred by her group. (Fazio and Powell, 1989).

1.2 Subjective Norms

Fishbein and Ajzen (1975) defined subjective norms as the person's perception that most people who are important to him/her think he/she should or should not perform the behavior in question. Subjective norms are intended to account for the person's behavior being influenced by the society he/she is exposed to. Thus, performing a particular behavior is also influenced by the others' opinions. One's intention to behave or to use product is determined not only by his/her attitude towards the behavior but is also influenced by others' opinions as well. (Fishbein and Ajzen, 1975). Most consumers are likely to seek out the opinions of the others to reduce their search and evaluation effort or uncertainty, especially if there should be risk involved in the decision making. Consumers may also seek out the others' opinions for guidance on new products or services. This also applied to the products with image-related contribution, or lacking sufficient information. These are the consumers, who interact socially with reference group, opinion leader, and family members to obtain product information and decision approval (http://faculty.inverhills.mnscu.edu). Agarwal (2000) stated that subjective norms exhibited considerably more influence on intentions than did attitudes, when presumably user had better information.

1.2.1 Subjective Norms and Behavioral Intention

Venkatesh and Morris (2000) suggested that the direct effect of the subjective norm on intention is strong in the early stages of new behavior and tends to wear off overtime. However, Chiou (1998) mentioned that the strength of social influences differ in cultures such as subjective norms was a significant indicator for behavioral intention in Korea, while attitude was found to overshadow the influence of subjective norms in the United States. In addition, a study on the effect of mood by Armitage, Corner and Norman (1999) suggested that subjective norms influenced intentions in a positive mood condition, whereas attitude influenced intention in a negative mood condition.

1.3 Behavioral Intention

Ajzen and Fishbein describe that the best indicator of whether a person will perform a certain behavior is that person's behavioral intention. Every decision made by an individual depends on the person's intention to perform the act. Furthermore, one's behavioral intentions are determined by two factors; one's attitude towards the act, and a social normative factors. One's attitude towards the act means an individual's evaluation of the act instead of the object. The social normative factor represents one's judgment about the expectations of the others and one's motivation to comply with those expectation (Ajzen and Fishbein, 1980).

Ajzen and Fishbein (1980) described that behavioral intention is a probability, as rated by the subject, that a person would perform the behavior. For this study, behavioral intention can be classified as consumer's purchase intention towards NGV. Therefore, the consumer's intention to purchase NGV will be used as the dependent variable in this study.

1.3.1 Intention and Behavior

According to the Theory of Planned Behavior (Ajzen, 1991; Ajzen and Madden, 1986), human behavior is a function of an individual's intention to perform the behavior in question. In its turn, intention is determined by a combination of three conceptual independent factors: (a) attitude towards the specific behavior, (b) subjective norms, and (c) perceived behavioral control which we will discuss in details in the related theory (see figure 2.2). Eventhough person's intention exists, there may be some obstacles preventing him / her from carrying out the behavior. These obstacles may be internal factors, such as, skills, abilities, knowledge, and adequate planning, as well as, external factors, such as, time, opportunity, and cooperation with other people (Ajzen and Madden, 1986). The Theory of Planned Behavior postulates that perceived behavior control influences behavior both directly and indirectly through an independent effect on behavioral intention (Ajzen and Madden, 1986). The more it is perceived that the behavior in question is not under control, the more it is expected that a direct link, between perceived behavioral control and behavior, not mediated by intention will be present.

1.4 Demographic Factor

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Researchers also examined consumer intention in terms of demographic factors as well as consumer attitude and subjective norms. Traditionally, demographic segmentations have been employed. These involve dividing the market by factors such as gender, age, income, occupational status and education levels. Demographic and other background information can provide some indicator to assist researchers to analyze factors that influence consumers' behavior. McCarty and Shrum (1993) mentioned that demographics clearly influence consumption behaviors both directly and by impacting other attributes of the individuals such as their personal values and decision styles, which also influence consumption. Kotler (2000) defined that consumer wants, preferences, and usage rates are often associated with demographic variables.

1.4.1 Age

Demographic is widely used to study consumers in automobile industry. Ford also used demographic segmentation to study alternative fuel trend for new vehicles. It was reported that consumers would move away from large vehicles because of environmental worries and demographic trends. The research had shown that 70% of the Americans are now very concerned with the environment and that fuel efficiency was one of the three most important factors in influencing people's choice of cars. The buying patterns of middle-aged Americans or baby boomer generation were changing with more emphasis on smaller and more flexible products. On the contrary, younger Americans expected to buy a fewer vehicles than their parents (McFadden, 1974). It indicates that the age of a consumer can have a significant influence on consumer behavior. How old a consumer is generally indicates what products he or she may be interested to purchase. Moreover, related to a person's age is his or her family's life-cycle, and this is the attitudes and behavioral tendencies of that person, which evolves maturity, experience, and changing income and status. For instance, young single spend more than average on alcohol beverages, education, and entertainment. New parents typically increase their spending on health care, clothing, housing, and food and decrease their spending on alcohol, education, and transportation (http://faculty.inverhills.mnscu.edu).

1.4.2 Gender

Gender is a significant variable that affects consumer attitude and decision making. Physiological differences between men and women result in different needs,

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such as health and beauty products. Just as important are the district culture, social, and economic roles played by men and women that can have effects on their decision making processes. For instance, when asked what features they would want on their next vehicles, generation Y men yearn for more gadgets and performance-oriented options, such as turbo-diesel or turbo-charged gas engines, high intensity headlight. Generation Y women, on the other hand, prefer features that provide organization, practicality, and convenience such as wet storage area, power rear seats, and cargo area dividers and heated or cooled cup holders (http://faculty.inverhills.mnscu.edu).

1.4.3 Education and Income

Teo (2001) suggested that higher education level is likely to have a positive relationship with technology usage. Karjaluoto, Mattila and Pento (2002) mentioned that the highly-educated, wealthy segment represents a profitable and less risky customer base for several reasons. Most importantly, they deal with larger sums of money and have more purchasing power in buying products and services. Solomon (1999) suggested that the distribution of wealth is of great interest to marketers because it determines which groups have a greatest buying power and market potential.

1.5 Other Influence Factors

1.5.1 Risk Perception

One of the most well-known biases is the availability bias (Tversky and Kahneman, 1974) which show that when risk consequences are readily available in the mind, because they are recently experienced, easily imaginable or having a high profile in the media (Combs and Slovic, 1979), the probability of occurrence will tend to be overestimated. For instance, the case of car explosion in Korat due to use LPG storage

tank instead of NGV storage tank (www.komchadluek.net). This effected consumers' risk perception of NGV installation. In the field of risk perception it has been observed that people's emotional reactions to situations often diverge from cognitive assessments of this situation. The perception of risk was strongly linked to the degree to which a hazard evoked a feeling of dread (Fischhoff et al, 1978). Alhakami and Slovic (1994) suggested that risk and benefit may be inversely related in people's minds because an overall affective feeling was referred to when the risk or benefit of specific hazards was judged. A negative feeling may enhance risk perception while decrease benefit perception at the same time.

1.5.2 Social Factors in risk Perception and Acceptance

Midden and Dorgelo (2004) explained that risk judgment can be developed through social processes of information diffusion and exchange, and through social influence on attitudes and behavioral choices. Information diffuses through the media, even more so through small social networks. Reduction of individual uncertainties will be sought for on the basis of information from the others. Local opinion leaders can exert strong influence, especially when official sources are not considered trustworthy.

In addition, one of the factors that plays an important role in these social processes is trust. Nowadays, with the experience of numerous studies in public perceptions of complex and social issues, it is generally acknowledged that the concept of "trust" plays a decisive role in the formation of attitudes toward new technologies. The function of trust can bridge knowledge gaps to dealing with potential danger, and there is little doubt that trust dimensions are important in creation and direction of public perceptions (Midden and Dorgelo, 2004). Recent energy technologies have raised question on benefits, costs and risks. Various instances of errors and problems have alerted consumers to be aware of these issues. The lack of ability to judge the quality of energy combined with the need to consume energy while maintaining the current life style, make trust a very important factor (Midden and Dorgelo, 2004).

Obviously these conditions also apply to the introduction of NGV as a new pervasive technology that raise questions among citizens about uncertainties regarding its quality and potential impact. In this case it is necessary to have trust and to understand the way in which trust influences people's attitudes. Several studies (Siegrist 1999; Finucane et al, 2000; Meijnders et al, 2004; Huijts and Midden, 2004) found support for the hypothesis that trust has an impact on the acceptance of technology via perceived risks and benefits. Normally one would expect that risks and benefits are evaluated independently and also that people will not engage in risky activities if there are no benefits, which indicate a zero relation or a negative relationship between perceived risks and benefits. The typical finding is that trust affects the relationship between perceived risks and benefits, in either less negative or positive level. The significance of trust in judgmental processes concerning new technologies also raises questions on the antecedents of trust.

1.6 Related Study of Attitude and Behavior

The study was conducted by Jamjit and Kenyam (2004) to investigate the attitudes and behaviors of taxi meter drivers in Bangkok toward natural gas vehicles and to study the problems caused by NGV in order to apply the result of the study to improve and develop natural gas for consumption among related departments.

The result from distributing 308 copies of questionnaires relating to attitude and behavior of taxi meter drivers towards NGV, to sampling random group, it is found that they perceived natural gas as cheap and cost effective fuel. However, NGV service stations need to cover areas as this matter is the main concern to the taxi drivers. Hence, NGV service station is also a significant factor that needed to rapidly be increased in numbers to meet users' satisfaction (Jamjit and Kenyam, 2004).

1.7 Related Study of Adoption and Use of New Technology

One of empirical researches related to the variables that researcher conducted was "The Adoption and Use of the Internet in South Korea" by Rhee and Kim (2004). They studied the adoption of internet diffusion in South Korea by examining sociodemographic factors, attitudes toward the internet and social supports (family support, in particular). Rhee and Kim indicated that these factors significantly influence the adoption of a new technolog BROTHER

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Rhee and Kim collected from 2,361 respondents who were also sampled among household members between 12 to 65 years of age. Each interview was conducted with a structured questionnaire and sample cards for responses. The result showed that social support from family was one of the most important factors that has influenced Internet usage both on the current user as well as the frequent user. Other characteristics, such as age, educational level and perception of the benefits from internet usage proved to be significant factors in internet adoption. The factor that does not have an effect on the adoption is the income level (i.e. affordability) because internet usage is easily accessible and widely available to the pubic in South Korea. Thus, affordability is a negligible factor in adopting the internet in South Korea.
This study indicates that the family functions as a mediating factor and a significant influence on the course of diffusion in the adoption of new technology. As a result, the decision to use the internet is likely to be influenced by behavioral pressures from social groups such as the family rather than by spontaneous behavior based on calculation of individual costs and benefits.

Furthermore, attitudes towards the internet can be classified into four different aspects: perceived benefit, perceived negative effect, alienation from the internet and perceived credibility. The 'perceived benefit', 'perceived negative effect' and 'perceived credibility' of the internet have positive effects on the adoption of the internet, whereas 'alienation from the internet' exerts a negative effect on its adoption. Moreover, the perceived negative attitude for the internet is also a negatively-affecting factor for internet adoption. But this attitude shows a reverse effect on internet adoption indicating that a desire to adopt the internet can be induced from experience and involvement of the individual concerned.

2. Theoretical Foundation

2.1 Theory of Planned Behavior (TPB)

The theory of reasonable action (Fishbein, 1967; Fishbein and Ajzen, 1975) is one of the most influential models in predicting human behavior and behavioral dispositions. The theory proposed that behavior is affected by behavioral intentions which, are affected by attitudes toward the act and by subjective norm. The first component, attitude toward the act, is a function of the perceived consequences people associate with the behavior. The second component, subjective norm, is a function of beliefs about the expectations of other important references he/she is motivated to comply with. The model received a lot of support in empirical studies of consumer behavior and social psychology related literature (Ryan and Holbrook, 1982; Sheppard, Hartwick, and Warschaw, 1988). However it has limitations in predicting behavioral intentions and behavior when consumers do not have volitional control over their behavior (Ajzen, 1991; Taylor and Todd, 1995). The theory of planned behavior was proposed to remedy these limitations (Ajzen, 1985 and 1991). It includes another source that will have influence on behavioral intentions and behavior, perceived behavioral control, in the model.



Figure 2.2 Theory of Planned Behavior (TPB)



The theory of planned behavior proposes that perceived behavioral control of the person in a decision making situation may affect his/her behavioral intentions. Perceived behavioral control is more important in influencing a person's behavioral intention particularly when the behavior is not wholly under volitional control. For instance, when purchasing an innovative product, consumer may need not only more resources (time, information, etc.), but also more self-confidence in making a proper decision. Therefore, perceived behavioral control becomes a salient factor in predicting a person's behavioral intention intention under this purchasing situation (Chiou, 1998).

Perceived behavioral control reflects beliefs regarding the access to resources and opportunities needed to perform a behavior. It may compass two components (Ajzen, 1991; Taylor and Todd, 1995). The first component reflects the availability of resources

needed to engage in behavior. This may include access to money, time and other resources. The second component reflects the focal person's self-confidence in the ability to conduct the behavior. The concept of perceived behavioral control is most compatible with Bandura (1977, 1982) concept of perceived self-efficacy which is concerned with judgment of how well one can execute required actions to deal with specific situations. People's behaviors are strongly influenced by their confidence in their ability to perform them. The theory of planned behavior places the construct of self-efficacy within more general framework in relations to attitude, subjective norm, and behavioral intention.

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The theory of planned behavior has received broad support in empirical studies of consumption and social psychology related literature (Ajzen, 1991; Ajzen and Driver, 1992; Ajzen and Madden, 1986; Taylor and Todd, 1995). As discuss in previous section, one of the empirical studies which supports the theory of planned behavior is "The Effects of Attitude, Subjective Norm, and Perceived Behavioral Control on Consumers' Purchase Intentions; The Moderating Effects of Product Knowledge and Attention to Social Comparison Information" by Jhy-Shen Chiou (1998). The purpose of this study is to investigate whether the relatively influences of attitude, subjective norms, and perceived behavioral control on consumers' purchase intentions will be different when consumer posses different levels of product knowledge (subjective and objective) and with the attention to social comparison information. As proposed by the theory of planned behavior, consumers' purchase intentions are affected not only by their attitudes, but also by their group's influences and their own perceived control. The relative strength of effects from these three factors on consumers' purchase intentions is expected to vary in

accordance to behaviors and situations. The result showed that the relative importance of

attitude, subjective norm, and perceived behavioral control in prediction of intention

varies when consumer posses different levels of product knowledge coupled with his/her awareness of attention to social comparison information.

The level of a consumer's product knowledge may affect his/her information and decision-making behavior (Bruck, 1985; Park, Mothersbaugh and Feick, 1994). Two knowledge constructs have been distinguished (Brucks, 1985; Park, Mothersbaugh and Feick, 1994). The first is objective knowledge; accurate information about the product class stored in the long term memory. The second is subjective knowledge; people's perceptions of what or how much they know about product class.

Although subjective and objective knowledge are related, they are distinct in two aspects (Alba and Hutchinson, 1987; Brucks, 1985). First, when people do not perceive accurate knowledge of the product or know little about it, subjective knowledge may overcome or under estimate one's actual product knowledge. Second, measure of subjective knowledge can indicate self-confidence levels as well as knowledge levels. That is, subjective knowledge can be included and interpreted as an individual's degree of confidence in his/her knowledge, while objective knowledge only refers to what an individual actually knows.

As discussed in the previous section, one component of perceived behavioral control in the theory of planned behavior is a person's self-confidence in the ability to conduct his/her behavior. But if a person has strong subjective product knowledge, he/she will have higher confidence in ability to carry on the consumption behavior. The attitude toward the behavior can over shadow the effect of perceived behavioral control. Therefore, the perceived behavioral control on behavioral intention will be weaker when consumers have high subjective product knowledge (Chiou, 1998).

On the other hand, if a person has low subjective product knowledge, he/she will have less confidence in the ability to carry out the consumption behavior. When forming behavioral intention, attitude toward the act will not be the dominating antecedent. Perceived behavioral control, on the other hand, will become and important factor of consideration (Chiou, 1998).

3. Theoretical Framework

The framework of this study reflects the researcher's concept to explain the factors influencing consumer intention towards the adoption of natural gas vehicles based on the Theory of Planned Behavior Model (Ajzen, 1985, 1989 and 1991). This theory is applied to acceptance of adoption new technology. The following chart on Decomposed Theory of Planned Behavior (DTPB) model is derived from Theory of Planned Behavior Model (Ajzen, 1985, 1989 and 1991) but also includes a decomposed belief structure into more details. Thus, by focusing on belief specifics and managing specific factors that influence it, the adoption behavior could be more manageable. In other word, the model becomes more managerially relevant, pointing to specific factors that may influence adoption and usage (Icek, 1985).

The researcher developed the conceptual model by identifying two major factors affecting behavioral intentions. The first major factor is attitudes, which is determined by perceived product benefit, perceived cost advantage, perceived refueling convenient, awareness of promotion and campaign. The second major factor is subjective norms, which are social influences and secondary sources that are adapted from DTPB.





Source: Taylor, S. and Todd, P. (1995), Understanding Information Technology Usage: A Test of Competing Models, Information System Research 6:2, p. 14

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4. Conceptual Frameworl

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The purpose of this section is to present the relationship of dependent and independent variables; main variables and sub-variables. The theories and concepts of the study from literature review are being applied to conceptual framework of this study. The research hypothesis and operationalization of the variables are defined for testing then.

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The two variables refer to independent variables, which are attitudes and subjective norms and dependent variable is behavioral intention.

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Independent Variables Dependent Variable Attitude Perceived **Product Benefit** Perceived Cost advantage and NGV filling convenient Awareness of Promotion and Campaign Intention to use NGV **Subjective Norms** Social Influence Secondary Sources 4.1 Key Variables: Independent Variables

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4.1.1 Attitudes

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Attitude refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question (Ajzen, 1999). To understand attitudes, one must know what exactly is meant by the term attitude, because there are many definitions for the term attitude. According to Zikmund (2000), the attitude is usually viewed as an enduring disposition to respond consistently in given manner to carious aspects of the world and is composed of affective, cognitive and behavioral components. Alternatively, the attitude can be defined as a learned predisposition to react in some consistent positive or negative way to given object, idea or set of information (Hair et al, 2000). Many variables that business researchers wish to investigate are psychological

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variables that cannot be directly observed. To measure the attitude, the researcher must infer from the way an individual responds to some stimulus. The term of hypothetical construct is used to describe variables that are not directly observable but measured through indirect indicators such as verbal expression, like scale, and semantic scale (Zikmund, 2000; Cooper and Schinder, 2002).

4.1.2 Subjective Norms

Subjective norms are also assumed to be a function of beliefs that specific individual's approval of performing the behavior. Beliefs that underlie subjective norms are termed normative beliefs. An individual will intend to perform a certain behavior when he/she perceived that other important influential members think he/she should. Other important influential members might be a person's spouse, close friends, physician, etc. This is assessed by asking respondents to judge how likely it is that most people who are important to them would approve or disapprove of their performing a given behavior (http://hsc.usf.edu).

4.2 Dependent Variables: Behavioral Intention

A cognitive plan to perform a behavior or action, created through a choice or decision process focuses on beliefs about the consequences of the action. It is an indication of how hard people are willing to try and of how much an effort they are planning to exert, in order to perform the behavior. It is influenced by three components: person's attitude toward performing the behavior, the perceived social pressure, called subjective norm and perceived behavioral control (http://hsc.usf.edu).

5. Proposed Hypotheses

After developing the conceptual framework and identifying appropriate variables, the researcher sets the hypothesis statement based on variables in the conceptual model. In this study, three groups of hypothesis were set up.

Group 1 Attitude and Behavioral Intention

- H1: There is a relationship between perceived product benefit and the intention to use NGV
- H2: There is a relationship between perceived cost advantage and NGV filling convenience with the intention to use NGV
- H3: There is a relationship between awareness of promotion and campaign and the intention to use NGV

Group 2 Subjective Norms and Behavioral Intention

ABOR

H4: There is a relationship between social influences and intention to use NGV H5: There is a relationship between secondary sources and intention to use NGV

Operationalization of the Independent and Dependent Variables

In this section, the operationalization table contains a concept, definition, operational components and measurement level of dependent and independent variables. The operationalization table is separated into three parts; attitudes, subjective norms, and behavioral intention.

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Part I: Attitude factors influencing consumer's behavioral intention

Concept	Definition	Operational Component	Type of measurement
Perceived Product Benefit	The degree to which the consumers perceive the advantages of NGV that influence consumer intention to use in connection to the quality of NGV	 Respondents perceive quality of NGV in term of it being environmental friendly and it does not damage engine Respondents perceive NGV can be a substitute for gasoline. Respondents perceive quality of NGV tank that is safe and not easily to explode. 	Interval
	and storage tank safety.	4. Respondents perceive that size of NGV tank is not an obstacle when	
	substitute oil and	being installed in the vehicle.	
	easy to use and	5. Respondents' perception that it is	
	maintenance	easy to use NGV engine.	
		6. Respondents' perception that	
		maintenance of NGV engine is easy	
MPZ		and convenience	
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	algos SINC	CE1969	
	ั /วิทยาส	ลัยอัสสีมา	

Concept	Definition	Operational Component	Type of measurement
Perceived Cost Advantage and NGV filling Convenient	1. The degree to which the consumer perceive cost advantage from using NGV in comparison to gasoline, including installation and maintenance cost that would influence consumer intention to use 2. The degree to	 7. Respondents' perception of NGV price in comparison to gasoline 8. Respondents' perception of installation cost of NGV equipment 9. Respondents' perception of convenience to access to the NGV service stations. 	Interval
	which the consumer perceive that the	Dox	
	service	-KS/TV	
	stations available in Bangkok would		
	influence consumer		
	intention to use		
Мр	The degree to which	10. Respondents' awareness of the	
Awareness of	awareness of NGV	substitution to gasoline through	
Promotion and	information from	media and advertising	Interval
Campaign	private and	11. Respondents received sufficient	
	government sectors	and accurate information from	
	would influence	government and private sectors that	
	consumer intention	support influence the use of NGV	
	to use NGV	MNIA *	
	SIN	CE1969	
	(Jansin	ลัยอัสส์สิน	

Concept	Definition	Operational Component	Type of measurement
Social Influences	The extent to which members of social network influences one' s behavior	 Friends/peer group influence to use NGV Colleagues influence to use NGV Family members influence to use NGV 	Interval
Secondary Sources	Influential sources of information through media such as news on TV, newspaper	 4. Newspaper influence to use NGV 5. Television influences to use NGV 6. Internet influences to use NGV 7. Information provided by gas stations 	Interval

Part II: Subjective norm factors influencing consumer's behavioral intention

Part III: Behavioral Intention

Concept	Definition Second	Operational Component	Type of measurement
Behavioral Intention	The probability, or at which rate the consumers have intention to change to use NGV	 Respondents have intention to use NGV within 6 month period Lower cost of NGV equipment installation being the main condition to change to 	Interval

CHAPTER 3

RESEARCH METHODOLOGY

This chapter discusses on the research method of this study, which includes the explanation about research methodology, respondents, sampling procedure, research instrument, collection of data and statistical tools used in this research.

1. General Procedures

This research used survey methodology to describe the factors influencing consumer intention to use natural gas for vehicle by cross-sectional design. The researcher collected primary data by surveying the sample only once. In order to use the survey technique, the researcher used questionnaires to gather information from respondents.

2. Design of the Study

The questionnaire for this research based on the theoretical and conceptual framework was divided into four parts, which are attitude, subjective norms, intention to use NGV and demographic factors.

3. Draft of the Instrument Development

3.1 Attitude

This part contained ten questions for evaluating attitude of respondents towards NGV by using a five-point Likert scale, ranging from strongly disagree to strongly agree (1 = strongly disagree to 5 strongly agree). The underlying attitude structure comprised of

perceived product benefit, perceived cost advantage and refueling convenience, and awareness of promotion and campaign.

3.2 Subjective Norms

This section involved study of factors related to subjective norms influencing respondents to use NGV. To measure subjective norms in this section, the questionnaire contained six questions in which the first three questions were social influence factors and the last three questions were relating to secondary sources by using five point Likert scale (1 = least influence to 5 = most influence).

3.3 Behavioral Intention

The objective of this part is to measure intention to use NGV. In order to measure respondents' intention to change to NGV, researcher asked respondents on the possibilities of their using the NGV based on five point Likert scale (1 = least likely to 5 = most likely).

3.4 Demographics

Demographics provided enough information about the typical member of this group to create a mental picture of this hypothetical aggregate. The last part involved study of differences attitudes determined by gender, age, educational level, occupation, and income. The questionnaire consisted of 6 questions to gather demographic data, which is personal information from the respondents.

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4. Pretest

Malhotra (1999) described that a pretest as the testing of the questionnaire on a small of respondents for the purpose of identifying and eliminating potential problem. Ordinarily, the pretest sample size is small, varying from 15 to 30 respondents for the initial testing, depending on the heterogeneity of the target population. Hence, to pretest this study, the researcher distributed questionnaires to 30 respondents.

For this pretest, the research used the Coefficient Alpha or Cronbach's Alpha to test on reliability. Malholtra (1999) mentioned that this method is the average of all possible of split-half coefficient resulting from different ways of splitting the scale items. This coefficient varies from 0 to 1, and a value of 0.6 or less generally indicated unsatisfactory internal consistency reliability.

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Table 3.1 Test Reliability

Variables ABOR	Number of Items	Cronbach's Alpha Value
Perceived Product Benefit	ICE1969	.774
Perceived Cost Advantage and NGV filling Convenient	าลัยอัสสัม	.860
Awareness of Promotion and Campaign	2	.704
Social Influences	3	.873
Secondary Sources	3	.762

From the Table 3.1, the results of reliability analysis of all variables have values greater than the standard value of 0.6. Thus, it can be concluded that this questionnaire has satisfactory internal reliability value.

5. Population and Sampling

The target population being studied totaled 200 car owners from the age of 21-55 years old, who are NGV-non users living in Bangkok area.

Sampling element is the unit from which the necessary data is collected (Davis, 1996). The sampling unit in this study targeted on any people who were NGV non-users, age between 21-55 years old, car owners, and living in Bangkok area. Researcher selected this unit mainly because this group of people was mostly employees and business owners who had their own cars and had a potential to become NGV users.

5.1 Determining the Sample Size

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The sample size is determined from the table proposed by Anderson (1996) who suggested that the population over 1,000,000 with 95 percent confidence level requires a size of study 384 samples. However, according to collection of data based on convenient method and for academic purpose, the sample size in this research was 200 samples.

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6. Collection of the Data

According to data collection for this study, the researcher used both primary and secondary sources. The primary source of this study was collected by distributing questionnaires to the targeted population in Bangkok. The questionnaire was designed to be in the type of closed questions for the purpose of quicker and easier for respondents to answer as well as for the researcher to collect data and analyze. In this study, selfadministered questionnaire was used as the method for collecting data from respondents and the respondents were selected based on convenient method.

The secondary sources were selected and accumulated from several sources, which include text books, internet, journals and research articles.

7. Proposed Data Processing and Analysis

The researcher analyses data collected from respondents using the methods based on the Statistical Package for Social Sciences (SPSS) program. The two procedures used in this study were Descriptive analysis and Pearson's Correlation Coefficient, suitable to test the hypothesis.

Descriptive Analysis is performed to derive the frequency tables and percentage in order to observe the distribution of variables within the population and it also means the most common statistical technique for tabulating data. Percent distribution indicates the percent of respondents who answer each of available response options of each survey item. Mean scores measure the similarity in respondents, but they do not indicate how response varies. In this study, descriptive analysis was used to test differences in the means of behavioral intention variables, broken down by the level of demographic variables that comprise of gender, age, occupation, education and income.

Pearson's Correlation Coefficient is the most widely used statistics, summarizing the strength of association between two metric; interval or ratio (Malholtra, 1999). The Pearson correlation coefficient was used to indicate a linear relationship between attitudes (perceived product benefit, perceived cost advantage and refueling convenience, and awareness of promotion and campaign) and subjective norms (social influences and secondary sources) in relation to the intention to use NGV.

		T
No.	Hypothesis Statements	Statistic
		Measurement
LJ1	There is a relationship between perceived product	Pearson's Correlation
111	benefit and intention to use NGV	Coefficient
H2	There is a relationship between perceived cost advantage and NGV filling convenient with intention to use NGV SINCE1969	Pearson's Correlation Coefficient
ЦЗ	There is a relationship between awareness of	Pearson's Correlation
115	promotion and campaign and intention to use NGV	Coefficient
114	There is a relationship between social influences and	Pearson's Correlation
F14	intention to use NGV	Coefficient
115	There is a relationship between secondary sources and	Pearson's Correlation
пэ	intention to use NGV	Coefficient

Table 3.2 Statistical measure used to test hypotheses

CHAPTER 4

DATA ANALYSIS AND RESULTS

In this chapter, the researcher presents the results of data collected by this survey method. The data was collected from distributing questionnaires to 200 target respondents. Section 4.1 presents descriptive statistical analysis showing demographic data of respondents, which the general information of respondents; gender, age, occupation, educational level and income level are explained. Section 4.2 presents the test of hypotheses which identify the relationship between attitudes and subjective norms in relations to intention to use NGV. Pearson's correlation coefficient was employed to identify the relationship between attitudes and subjective norms in relations to intention to use NGV. Section 4.3 presents answers to the research questions.

1. Descriptive Data Analysis

1.1 Gender

Table 4.1 Gender of respondents

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Ge	ender	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	90	45.0	45.0	45.0
	Female	110	55.0	55.0	100.0
	Total	200	100.0	100.0	

Table 4.1 shows that female accounted for 55% (110 respondents) and the rest are male 45% (90 respondents).

1.2 Age groups

Table 4.2 Age of respondents

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				Valid	Cumulative
Age (years)	Frequency	Percent	Percent	Percent
Valid	21-25	20	10.0	10.0	10.0
	26-30	85	42.5	42.5	52.5
	31-35	52	26.0	26.0	78.5
	36-40	22	11.0	11.0	89.5
	41-45	10	5.0	5.0	94.5
	46-50	8	4.0	4.0	98.5
	51-55	3	1.5	1.5	100.0
	Total	200	100.0	100.0	

Table 4.2 shows the age range of respondents. The majority of respondents are aged between 26-30 years old of age representing 42.5% (85 respondents), followed by age group of between 31-35 years old representing 26% (52 respondents). The third is a group of between 36-40 years old representing 11% (22 respondents). The fourth group comprises of those between 21-25 years old representing 10% (20 respondents) and rest are the groups ranging between 41-45, 46-50, and 51-55 years old representing 5% (10 respondents), 4% (8 respondents), and 1.5% (3 respondents) respectively.

1.3 Income Levels

Table 4.3 Monthly income level of respondents

Income

				Valid	Cumulative
М	onthly Income	Frequency	Percent	Percent	Percent
Valid	<10,000	18	9.0	9.0	9.0
	10,001-20,000	36	18.0	18.0	27.0
	20,001-30,000	47	23.5	23.5	50.5
	30,001-40,000	29	14.5	14.5	65.0
	40,001-50,000	33	16.5	16.5	81.5
	>50,000	37	18.5	18.5	100.0
	Total	200	100.0	100.0	

Table 4.3 shows that the majority of respondents are those with monthly incomes ranging between Baht 20,001-30,000 accounting for 23.5% (47 respondents). Next is the group with monthly income of more than Baht 50,000 which is 18.5% (37 respondents). The third group is those with monthly income between Baht 10,001-20,000 accounting for 18% (36 respondents). The fourth group comprises of those with monthly income between Baht 40,001-50,000 accounting for 16.5% (33 respondents). The rest are respondents with monthly income ranging from of Baht 30,001- 40,000 accounting for 14.5% (29 respondents), and those with less than Baht 10,000 accounting for 9% (18 respondents), respectively.

1.4 Educational Levels

Table 4.4 Educational levels of respondents

Education

				Valid	Cumulative
Education Level		Frequency	Percent	Percent	Percent
Valid	Below Bachelor	9	4.5	4.5	4.5
Bachelor		114	57.0	57.0	61.5
	Above Bachelor	77	38.5	38.5	100.0
	Total	200	100.0	100.0	

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Table 4.4 shows that 57% (114 respondents) of the people surveyed are holders of Bachelor degree while 38.5% (77 respondents) holds higher than Bachelor degree, and 4.5% (9 respondents) holds lower than Bachelor degree.

1.5 Occupation

Table 4.5 Occupation of respondents

	*		Occupation	*	6
Occ	upational Level	SIN	ICE1969 Percent	Valid Percent	Cumulative Percent
Valid	Student		1622.5	2.5	2.5
	Private Employee	157	78.5	78.5	81.0
	Government Officer	29	14.5	14.5	95.5
	Business Owner	4	2.0	2.0	97.5
	Others	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

Table 4.5 shows that majority occupation of the respondents is private employee,78.5% (157 respondents). The next occupation is government officer, 14.5% (29

respondents). The following two groups of occupation are students 2.5% (5 respondents) and business owner, 2% (4 respondents) respectively.

2. Testing of the Hypothesis

Hypothesis 1

H16: There is no relationship between perceived product benefit and intention

to use NGV

H1₁: There is a relationship between perceived product benefit and intention to use NGV

Table 4.6 Pearson's correlation coefficient test of relationship between perceived product benefit and intention to use NGV

S	ROTHER Correlation	SBRIEL	A
SA	of A	Intention to Use	Product
	Pearson Correlation	VINCIT 1	.140*
Intention to Use	Sig. (2-tailed)	,	.048
al a	N	200	200
~~8	Pearson Correlation	69 .140*	1
Product Benefit	Sig. (2-tailed)	.048	
	N 14 เลยเ	200	200

* Correlation is significant at the 0.05 level (2-tailed).

Table 4.2 shows that finding of the test of relationship between perceived product benefit and intention to use NGV is 0.048, which is less than 0.05 level of significant (0.048<0.05). This indicates that there is enough evidence to reject null hypothesis, therefore, the researcher accepted that alternative hypothesis. Hence, there is a relationship between perceived product benefit variable and intention to use NGV. The value of Pearson correlation (r) is 0.140, which is implied a low positive relationship between the two variables.

Hypothesis 2

H2o: There is no relationship between perceived cost advantage and NGV filling convenience, and intention to use NGV

H2: There is a relationship between perceived cost advantage and NGV filling convenience, and intention to use NGV

Table 4.7 Pearson's correlation coefficient test of relationship between perceived cost advantage and NGV filling convenience, and intention to use NGV

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2 1		DY2	A
\geq	Correlation	ns A Sta	
DS		Intention to use	Cost
Intention to Use	Pearson Correlation Sig. (2-tailed)	61 GABRIEL 1	.152*
	N	200	200
Cost Advantage	Pearson Correlation	.152*	1
Cost Auvantage	Sig. (2-tailed)	.031 🗙	
×190	N SINCE196	o 200,	200
*.Correlation is significant at the 0.05 level (2-tailed).			

Table 4.2 shows that finding of the test of relationship between perceived cost advantage and NGV filling convenience, and intention to use NGV is 0.031, which is less than 0.05 level of significance (0.031<0.05). This indicates that there is enough evidence to reject null hypothesis, therefore, the researcher accepted that alternative hypothesis. Thus, there is a relationship between perceived cost and convenient variables, and intention to use NGV. The value of Pearson correlation (r) is 0.152, which is implied a low positive relationship between the two variables.

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Hypothesis 3

H3₀: There is no relationship between awareness of promotion and campaign,

and intention to use NGV

H31: There is a relationship between awareness of promotion and campaign, and

intention to use NGV

Table 4.8 Pearson's correlation coefficient test of relationship between awareness

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of promotion and campaign and intention to use NGV

Correlations			
4	, and	Intention to Use	Promotion
0	Pearson Correlation	1	.206*
Intention to Use	Sig. (2-tailed)		.003
	N N	200	200
Dramation	Pearson Correlation	.206*:	1
Promotion	Sig. (2-tailed)	.003	
	N -	200	200
** Correlation is significant at the 0.01 level (2-tailed)			

Table 4.3 shows that the result of hypothesis testing the relationship between awareness of promotion and campaign, and intention to use NGV is 0.003, which is less than 0.05 level of significance (0.003<0.05). This indicates that there is enough evidence to reject null hypothesis, therefore, the researcher accepted the alternative hypothesis. It means that there is relationship between promotion and campaign variables and intention to use NGV. The value of Pearson correlation (r) is 0.206, which is implied a low positive relationship between the two variables.

Hypothesis 4

H4₀: There is no relationship between social influences and intention to use NGV

H41: There is a relationship between social influences and intention to use NGV

Table 4.9 Pearson's correlation coefficient test of relationship between social influences and intention to use NGV

	0.011.0144		
		Intention to Use	Social
	Pearson Correlation		.266*
Intention to Use	Sig. (2-tailed)		.000
	N	200	200
6	Pearson Correlation	.266**	1
Social Influence	Sig. (2-tailed)	.000	
	N	200	200
**:Correlation is significant at the 0.01 level (2-tailed).			

Correlations

Table 4.4 shows that finding of the test of relationship between social influences and intention to use NGV is 0.000, which is less than 0.05 level of significance (0.000<0.05). This indicates that there is enough evidence to reject null hypothesis, therefore, the researcher accepted the alternative hypotheses. It means that there is relationship between social influences variables and intention to use NGV. The value of Pearson correlation (*r*) is 0.140, which is implied a low positive relationship between the two variables.

Hypothesis 5

H50: There is no relationship between secondary sources and intention to use

NGV

H51: There is a relationship between secondary sources and intention to use

NGV

Table 4.10 Pearson's correlation coefficient test of relationship between secondary sources and intention to use NGV

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Correlations				
21		Intention to Use	Secondary	
	Pearson Correlation	1	.303*	
Intention to Use	Sig. (2-tailed)		.000	
	N	200	200	
Cacandary Sources	Pearson Correlation	.303*:	1	
Secondary Sources	Sig. (2-tailed)	.000		
200 2 200 2				
**.Correlation is	significant at the 0.01	l level (2-tailed).	<>>	

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Table 4.5 shows that finding of the test of relationship between secondary sources and intention to use NGV is 0.000, which is less than 0.05 level of significant (0.000<0.05). This indicates that there is enough evidence to reject null, hypotheses, therefore, the researcher accepted that alternative hypothesis. This explains that, there is a relationship between secondary sources variables and intention to use NGV. The value of Pearson correlation (*r*) is 0.303, which is implied a low positive relationship between the two variables.

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3. Answering the Research Questions

3.1 What are the perception and awareness of respondents towards NGV?

To answer this question, researcher used descriptive statistics to determine what the perception and awareness of respondents towards NGV. 25.5% (51 respondents) strongly agree that number of NGV filling station is a factor influencing intention to use NGV. Other factors influencing intention to use are quality of NGV 43% (86 respondents), oil substitution 48% (96 respondents), and price of NGV 47.5% (95 respondents). 43% (86 respondents) are not sure about safety and 28.5% (57 respondents) are not sure about size of NGV tank. 58% (116 respondents) and 55% (110 respondents) are not sure that engine is easy to use and maintenance, respectively. Moreover 27% (54 respondents) disagreed that cost of NGV installation is factor influencing them to use NGV.

Most of respondents, 57% (114 respondents), agree that promotion and campaign from private and government sectors are factors influencing the adoption of NGV and 39% (78 respondents) agree that sufficient and accurate information from related sectors are factors influencing them as well, 96% (192 respondents) know the NGV, and 4% (8 respondents) do not know the NGV. Most of respondents have awareness of NGV from media (television and radio) 44.6% (164 respondents) and second source is 19.6% (72 respondents) know NGV from gas stations. Third source, 14.1% (52 respondents) know NGV from their friends. Fourth source is leaflets from government and private sector, 13.6% (50 respondents), and internet is 6.8% (25 respondents), and other sources (taxi drivers, newspapers, and car magazines) are 1.4% (5 respondents), respectively.

In summary, respondents perceive the number of NGV filling stations are the most significant factor influencing the adoption of NGV. In addition, respondents have awareness of NGV from the media.

3.2. What is the relationship between attitude factors and consumer intention towards the adoption of NGV?

From table 4.1- 4.3, the results of hypotheses testing (H1-H3) indicate that there are significant relationships between attitude factors and consumer intention towards the adoption of NGV. According to the significant values of those are less than the set criteria (0.05 level of significant), the null hypotheses is rejected.

Pearson's correlation values between 2 variables; attitude factors and consumer intention to use NGV, are low positive relationship. Thus, it is implied that those attitude factors do not strongly influence to intention toward the adoption of NGV.

3.3. What is the relationship between subjective norms factors and consumer intention towards the adoption of NGV?

From table 4.4 and 4.5, the results of hypotheses testing (H4 and H5) indicate that there are significant relationship between subjective norms factors and consumer intention towards the adoption of NGV. According to the significant value is less than the set criteria (0.05 level of significant), the null hypotheses is rejected.

Pearson's correlation values between 2 variables, subjective norms factors and consumer intention to use NGV, are low positive relationship. Thus, it is implied that

those subjective norms factors do not strongly influence to intention towards adoption of NGV.

3.4 What is the respondent intention to use NGV in six month later?

As of results, most of respondents, 56% (112 respondents), are not sure that they will use NGV in next six month and 18% (36 respondents) are unlikely to use. 14% (28 respondents) are most unlikely to use and 9% (18 respondents) are likely to use. Only 3% (6 respondents) are most likely to use NGV in next six months.



CHAPTER 5

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This chapter consists of four sections. In section 1, the researcher presents a summary of the study and major findings on descriptive statistics and hypotheses testing of this study. Section 2, discusses the results of the study. In Section 3, researcher would like to present recommendations for practice on research findings. In addition, section 4 is the final section representing recommendations for further study.

1. Conclusions

1.1 Summary of the Study

In this study, the summary of the result is derived from the data collected from 200 target respondents using convenient samples method. The data collected are from distributed questionnaires designed and analyzed by using Statistical Package for Social Science (SPSS) program.

1.1.1 Attitude

This research indicated that attitude is perceived as the main factor that received the most attention as being widely used to predict consumer's likelihood to adopt to new product and technology. In this study, there are three variables. One of them is "perceived product benefit", where the second one is "perceived cost advantage and NGV filling convenience", and the third concerns "awareness of promotion and campaign" of the product. The research findings show all three variables of attitude are significant factors that have low positive correlation with intention to use NGV. It can be concluded that from the ratio as presented here, the perceived product benefit of r = 0.014, perceived cost

advantage and NGV filling convenient of r = 0.152, and awareness of promotion and campaign of r = 0.266 implied that among the sampled respondents, all three factors have low influence toward consumer intention to use NGV.

1.1.2 Subjective Norms

From this research it is also clear that social influences as well as secondary sources are significant factors influencing intention to use NGV. But these are variables with low positive correlation to the intention to use NGV. The social influences factors indicate a positive ratio of 0.266, whereas secondary sources factors show positive ratio of 0.303.

1.2 Major Findings

1.2.1 Findings on Demographic of Respondents

In this study, descriptive statistical analysis was used to describe demographics of respondents relating to gender, age, educational level, occupation, and income level. From 200 target respondents, 45% (90 respondents) are male and 55% (110 respondents) are female. The majority age group of the respondents in this survey is between 26-30 years old accounting for 42.5% (85 respondents). A total of 57% (114 respondents) hold bachelor degree. The majority occupation of the respondents is private employees, 78.5% (157 respondents) and has income level of between Baht 20,001-30,000.

1.2.2 Findings on Results of Hypotheses Tests

The researcher chose Pearson's correlation coefficient as the main technique to test the relationship between attitude variables (hypotheses 1-3) and subjective norms variables (hypotheses 4-5) in relation to respondents' intention to use NGV. The result shows less than 0.05 ratio points in all hypotheses meaning that the null hypotheses are rejected. Thus it can be concluded that attitude and subjective norms have significant relationship with respondents' intention toward the adoption of NGV.

For the attitude factors (hypotheses 1 - 3), the values of Pearson's correlation coefficient are 0.140, 0.152 and 0.206, respectively. But when taking subjective norms factors (hypotheses 4-5) into consideration, the values of Pearson's correlation coefficient are 0.266 and 0.303, respectively. It indicates that all of the independent variables have low positive relationship with dependent variables. The summary of the results of Pearson's correlation coefficient are shown in Table 5.2

Table 5.1: Summary of the test of Pearson's correlation coefficient

Hypotheses	Significant Value	Pearson's	Results
DS	(2-tailed) DS	Correlation	A
S	TERS OF	SI GAD	~
H1, Perceive product benefit	LABO 0.048	0.014	Reject M1, accept H10
H2, Perceive cost advantage	0.031 OMNIA	0.152	Reject H21, accept H20
and NGV filling convenient			
H3, Awareness of promotion	0.003	0.206	Reject H31, accept H30
and campaign			
H4, Social influences	0.000	0.266	Reject H41, accept H40
H5, Secondary sources	0.000	0.303	Reject M51, accept H50

1.2.3 Findings on Intention to use NGV

In this part, the researcher used descriptive statistics to determine the respondents' intention to use NGV within the next 6 months. Out of the 200 respondents surveyed, 56% (112 respondents) indicate their uncertainty to use NGV. The next group of 36 respondents (18%) shows the possibility that they will use NGV. The third group of 28 respondents (14%) shows no interest to change to NGV. Those with the most tendency to change to NGV totaled 6 respondents (3%), while 18 respondents (9%) show the next likelihood to change.

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Table 5.2: Summary the results of respondents' demographic and intention to use NGV

Intention to use	Number of respondents
5 34	to a start E
Most unlikely	28 (14%)
Unlikely	36 (18%)
Unsure	112 (56%)
Likely &	SINCE1969 ¹⁸ (9%)
Most likely	ใยาลัยอัส 6 (3%)

2. Discussion

The research findings indicated that all factors have low influence on consumer intention to use NGV. In addition, the tendency of the consumers' intention to use NGV within the next six months is rather low. Therefore it can be implied that there are also other factors that have more influences on consumer intention to use NGV. In the previous study, Duann and Hegazy (1922) found that there were more factors that explain the lack of progress on development and used of NGV. These factors include insufficient consumer interest and knowledge, uncertainty about long-term prospect of natural gas supply and adequate provision the refueling and repairing services. Another commonly cited explanation was the low price and abundant supply of gasoline at present, when compared to alternative fuels like NGV make NGV less attractive to vehicle users.

3. Recommendation for Practice

The purpose of this research is to determine consumer attitudes and subjective norms with consumer intention to use NGV so that the result of the research can be implemented to improve and develop NGV programs by government and private sectors in order to expand the NGV usage as alternative fuel in Thailand and hopefully this at the same time will help solve the pollution problems in Bangkok.

The research findings show that perceived product benefit (r = 0.014), perceived cost advantage and NGV filling convenient (r = 0.152), and awareness of promotion and campaign (r = 0.266) are all the variables that indicate that attitude has significant relationship to the low positive correlation toward intention to use NGV. The important result shows that most of respondents (56%) are uncertain to use NGV within the next six months. It indicates that consumers are reluctant to use NGV. It is also implied that consumers have low information and are unawared of the product such as NGV. According to Siegrist and Cvetkovich (2000), their study on effects of social and trust explained a relationship between trust and judged risk and benefits for the hazards caused by people's lack of knowledge. Trust has proved to have a direct effect on both perceived benefits and risks as well as on attitudes. In summary, people base their beliefs and attitudes towards a
technology with risks on trust they conceived in the involved actors (Huijts & Midden, 2004). The researcher sees that the Government and related sectors need to invest more to promote NGV benefits and cost advantage to the public as well as to increase brand awareness among the public in order to influence people's better attitudes towards and acceptance to use NGV.

The results also show that social influences and secondary sources do have relationship to the consumer intention to use NGV. Both variables have low positive correlation with intention to use NGV. The social influences factors show a positive ratio of 0.266, whereas secondary sources factors show positive ratio of 0.303. Although they do not strongly influence tendency to use NGV, secondary sources show a closer to the medium of positive correlation of 0.4, which is the greatest correlation to the intention to use NGV. This indicated that information from secondary sources have more influence than other factors in this research. The results suggest that it is necessary to work on aggressive promotion and campaign via media such as television, newspaper, radio, magazine and leaflet. This may increase consumer perception and awareness of NGV. This is confirmed by Roger (1995), who identified secondary sources of information as a strong influence, especially on early adopter, especially the media being the important mean in this study.

However NGV development program should emphasize both social influences as well as secondary sources. Friends and family members play important roles in influencing the individual's purchase decision (Schiffman and Kanul, 1983). Moreover, Kotler (2000) stated that the opinion on specific product of the socially-involved or influential leaders, being spreaded by his/her own words, can deliberately increase the general consumers' enthusiasm on the product category. Thus the promotion of NGV promotion can also be best introduced through messages by celebrity spokeperson to increase brand awareness as well as credibility among consumers.

4. Recommendations for Further Study

The limitations of this research as realized by the researcher is that the study would require more of extended scope of the study. Firstly, the scope of this research was limited only in the Bangkok area. More studies should be extended to cover other geographical areas as well. The consumers in different areas may perceive differently in terms of factors influencing their intention to use NGV. Secondly, researcher used convenient method to collect data and limited sample size of the study to 200 respondents instead of 400 samples of theoretical sample size for different size of population (Anderson, 1996), the result derived from the data in this study could be deviated. For further research, it should be relied on theoretical sample size for more reliability. Thirdly, this study focused only on attitude and subjective norm factors towards consumer intention to use NGV. For better results, additional factors should be included for investigation, for instance, economical, technological, regulatory factors, etc. Fourthly, further research is needed to investigate in greater details since this research focused only on attitude factors and subjective norm factors influencing the intention to use NGV. Further research should as well be focused on demographic factors. Detailed analysis on the demographics would provide deeper insights on how consumer intention could be influenced and how the potential of market program could be enhanced.

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i. F



มหาวิทยาลัยอัสสัมชัญ วิทยาลัยการศึกษาทางไกลอินเทอร์เน็ต

แบบสอบถาม

เรียน ท่านผู้ตอบแบบสอบถาม

แบบสอบถามนี้เป็นส่วนหนึ่งของการศึกษาสาขาการจัดการ คณะบริหารธุรกิจมหาวิทยาลัยอัสสัมชัญ เรื่อง "ปัจจัยที่มีผล ต่อพฤติกรรมการเลือกใช้ก๊าซธรรมชาติ (NGV) ของผู้ขับขี่รถยนต์ในกรุงเทพมหานคร" ผู้วิจัยจึงขอความร่วมมือจากท่าน ได้โปรด ตอบแบบสอบถามตามความเป็นจริง เพื่อจะให้ได้ข้อมูลในการเสนอแนะผู้เกี่ยวข้องในการเลือกใช้ก๊าซธรรมชาติ (NGV) และแนว ปฏิบัติที่จะใช้ประโยชน์จากก๊าซธรรมชาติ (NGV) มากที่สุด

ข้อมูลที่ได้จะถูกเก็บเป็นความลับและใช้ประโยชน์ทางด้านวิชาการเท่านั้นเพื่อเป็นประโยชน์ต่อการวิจัย ทั้งนี้ผู้วิจัย ขอขอบคุณทุกท่านที่ให้ความร่วมมือตอบแ<mark>บบสอบถามมา ณ โอกาสนี้</mark>

<u>หมายเหต</u> ผู้ตอบแบบสอบถามจะต้อ<mark>งเป็นเจ้าของรถยนต์ส่วนบุคค</mark>ลที่มี<mark>อายุตั้งแต่ 20</mark> ปีขึ้นไปเท่านั้น

ส่วนที่ 1 ความคิดของกลุ่มตัวอย่ <mark>างเห็นต่อก๊าซธรรมชาติ (NGV)</mark>
คำชี้แจง ขอให้ท่านพิจารณาคำถามต่อไปนี้ตามความคิดเห็นของท่าน โดยใส่เครื่องหมาย X ลงในช่อง 🖵 ที่ตรงกับความเห็นของ
ท่านมากที่สุด
* OMNIA *
1. ท่านรู้จักก๊าซธรรมชาติ (NGV) หรือไม่
🗖 รู้จัก 💭ไม่รู้จัก (หากเลือกข้อนี้โปรดอ่านเอกสารหน้าสุดท้ายและข้ามไปตอบข้อ4)
2. ท่านรู้จักก๊าซธรรมชาติ (NGV) จากที่ใด (ตอบได้มากกว่า 1 ข้อ)
🗖 เพื่อน 🗖 สื่อวิทยุ / โทรทัศน์ 🗖 สถานีบริการน้ำมัน
🗖 เพื่อน 🗖 สื่อวิทยุ / โทรทัศน์ 🗖 สถานีบริการน้ำมัน 🗖 เอกสารจากหน่วยงานรัฐ / เอกชน 🗖 อินเทอร์เนต 🗖 อื่นๆ ระบุ
 เพื่อน สื่อวิทยุ / โทรทัศน์ สถานีบริการน้ำมัน เอกสารจากหน่วยงานรัฐ / เอกชน อินเทอร์เนต อึ่นๆ ระบุ ภ่านทราบหรือไม่ว่ารถยนต์ที่ใช้ก๊าชธรรมชาติ (NGV) สามารถประหยัดค่าใชจ่ายได้ประมาณ 70% เมื่อเทียบกับน้ำมัน
 เพื่อน สื่อวิทยุ / โทรทัศน์ สถานีบริการน้ำมัน เอกสารจากหน่วยงานรัฐ / เอกชน อินเทอร์เนต อึ่นๆ ระบุ 3. ท่านทราบหรือไม่ว่ารถยนต์ที่ใช้ก๊าชธรรมชาติ (NGV) สามารถประหยัดค่าใชจ่ายได้ประมาณ 70% เมื่อเทียบกับน้ำมัน ทราบ ไม่ทราบ
 □ เพื่อน □ สื่อวิทยุ / โทรทัศน์ □ สถานีบริการน้ำมัน □ เอกสารจากหน่วยงานรัฐ / เอกชน □ อินเทอร์เนต □ อี่นๆ ระบุ 3. ท่านทราบหรือไม่ว่ารถยนต์ที่ใช้ก๊าซธรรมชาติ (NGV) สามารถประหยัดค่าใชจ่ายได้ประมาณ 70% เมื่อเทียบกับน้ำมัน □ ทราบ □ น่าราคาการติดตั้งอุปกรณ์ NGV อยู่ที่ 25,000 – 35,000 บาท สำหรับระบบดูด และ 48,000 – 53,000 บาทสำหรับระบบ
 เพื่อน สื่อวิทยุ / โทรทัศน์ สถานีบริการน้ำมัน เอกสารจากหน่วยงานรัฐ / เอกชน อินเทอร์เนต อื่นๆ ระบุ

ส่วนที่ 2 ปัจจัยที่มีผลต่อการเลือกใช้ก๊าชธรรมชาติ (NGV)

คำชี้แจง คำถามในส่วนนี้เป็นการถามความคิดเห็นของท่านต่อปัจจัยต่างๆที่มีผลต่อการเลือกใช้ก๊าซธรรมชาติ (NGV) ขอให้ท่าน พิจารณาคำถามต่อไปนี้ตามความคิดเห็นของท่าน โดยใส่เครื่องหมาย X ลงในช่อง□ ที่ตรงกับความเห็นของท่านมากที่สุด

ข้อที่	ปัจจัยที่มีผลต่อการเลือกใช้ก๊าซธรรมชาติ (NGV)	ระดับความคิดเห็น					
	ด้านผลิตภัณฑ์	เห็นด้วย อย่างยิ่ง (5)	เห็นด้วย (4)	ไม่แนใจ (3)	ไม่เห็นด้วย (2)	ไม่เห็นด้วย อย่างยิ่ง (1)	
1	คุณภาพของก๊าซธรรมชาติ (NGV) ซึ่งไม่ทำล า ย สิ่งแวดล้อมและเครื่องยนต์	RSI					
2	ก๊าซธรรมชาติ (NGV) ใช้ทดแทนน้ำมันได้						
3.	ความปลอดภัยจากตัวถังที่บรรจุก๊าซธรรมชาติ (NGV) เช่น ไม่เกิดรอยรั่วหรือระเบิดง่าย	24		~			
4	ขนาดของตัวถังที่บรรจุเชื้อเพลิง เช่น ไม่ทำให้เกะกะ ช่องวางของท้ายรถ	Ż.	SA	HA			
5	เครื่องยนต์ระบบ ก๊าซธรรม <mark>ชาติ (N</mark> GV)ใช้งานง่าย	+	A FAS				
6	เครื่องยนต์ระบบ ก๊าซธรรมช <mark>าติ NGV ดูแลรั</mark> กษาง่าย เช่นการตรวจเช็ครอยรั่วของถัง <mark>ก๊าซ หรืออุปกรณ์อื่นๆ</mark>	JS	BRIEL	AN			
	ด้านราคา	1.1		0		a serie a se	
7	ราคาของก๊าซธรรมชาติ (NGV)	VI	ICIT				
8	ค่าใช้จ่ายในการติดตั้งเครื่องยนต์ ก๊าซธรรมชาติ NGV	A		*			
	ด้านการจัดจำหน่าย SINCE	1909 d	1987 1987		1		
9	ปริมาณสถานีบริการเติมก๊าซธรรมชาติ (NGV)	ງວັສສ	0				
	ด้ำนการสนับสนุน	Alexandra de		Sere-			
10	การรณรงค์จ า กสื่อต่างๆให้ในม า ใ ช้ก๊ า ซธรรมชาติ (NGV) แทนน้ำมัน						
11	ได้รับข้อมูลที่เพียงพอและถูกต้องจากภาครัฐและ เอกชนก่อนนำมาใช้จริง						
	ด้านสังคม	TCR.					
12	คำแนะนำหรือเชิญชวนจากเพื่อนๆในกลุ่ม						
13	คำแนะนำหรือเชิญชวนจากเพื่อนร่วมงาน						
14	คำแนะนำหรือเชิญชวนจากครอบครัว, ญาติพี่น้อง						

15	ข่าวหรือข้อมูลที่ได้จาก สื่อ โทรทัศน์, วิทยุ, ป้าย			
	ประกาศ, โครงการรณรงค์ ฯลฯ			
16	ข่าวหรือข้อมูลที่ได้จากอินเทอร์เนต	85.7		
17	ข้อมูลจากสถานีบริการเติมน้ำมัน			

ส่วนที่ 3 ความตั้งใจในการใช้

คำชี้แจง ขอให้ท่านพิจารณาคำถามต่อไปนี้ตามความคิดเห็นของท่าน โดยใส่เครื่องหมาย X ลงในช่อง□ ที่ตรงกับความเห็นของท่าน มากที่สุด

r		20.						
	ระดับความคิดเห็น							
ซ้อที่	ความตั้งใจในการใช้ก๊าซธรรมชาติ (NGV)	ตั้งใจใช้	ตั้งใจใช้	ไม่แนใจ/ไม่	ตั้งใจจะไม่	ตั้งใจจะไม่		
		แน่นอน		ตัดสินใจ	ใช้	ใ ช้แน่นอน		
		(5)	(4)	(3)	(2)	(1)		
1	ท่านตั้งใจที่จะใช้ก๊าซธรรมชาติ (N <mark>GV) ในอีก 6 เดือน</mark>	A.						
	ข้างหน้าหรือไม่		NB	P				
2	ถ้าค่าใช้จ่ายในการติดตั้งอุป <mark>กรณ์ NGV ถูกล</mark> ง 15 -20%	+	AL FOR					
	ท่านจะใช้ NGV	S	Ser.					
<u>ส่วนที่ 4 ร</u> ่	ข้อมูลส่วนด้วของผู้ตอบแบบสอบถาม 1. เพศ □ ชาย 2. อายุ □ 21-25 ปี □ 26-30 ปี □ □ 41-45 ปี □ 46-50 ปี □ 3. รายได้ส่วนส่วนบุคคลเฉลี่ยต่อเดือน □ น้อยกว่า 10,000 บาท □ 10,000-2 □ 30,001-40,000 บาท □ 40,001-5 4. วุฒิการศึกษาสูงสุด	1969 อ อัสด์ 31-35 ปี 51-55 ปี 0,000 บาท 0,000 บาท	NCTT 36-4 มากร 20,0 มากร	0 ปี กว่า 55 ปี 01-30,000 บา กว่า 50,000 บา	ท าท			
		ญาตรี	🗖 สูงกา	ว่าปริญญาตรี				

5. อาชีพปัจจุบัน

🔲 นักศึกษา	🛛 พนัก	งานบริษัทเอกชน	🔲 ข้าราชการ / พนักงานรัฐวิสาหกิจ
🔲 ธุรกิจส่วนตัว /	ค้าขาย	🔲 รับจ้าง	🗖 อื่นๆ ระบุ

*** ขอขอบคุณผู้ตอบแบบสอบถามทุกท่าน ***

<u>ข้อมูลเกี่ยวกับก๊าซธรรมชาติสำหรับยานยนต์หรือ NGV</u>

ก๊าซธรรมชาติสำหรับยานยนต์หรือ NGV เป็นสารประกอบไฮโดรคาร์บอน มีองค์ประกอบ คือ ก๊าซมีเทนเป็นส่วนใหญ่ จึงเป็น ก๊าซที่มีน้ำหนักเบา สามารถนำมาใช้เป็นเชื้อเพลิงในรถยนต์ ได้ดีกว่าน้ำมันหรือก๊าซหุงต้ม)ก๊าซแอลพีจี(เพราะเผาไหม้ได้สะอาด หมดจด ปลอดภัย ไม่มีการสะสมลุกไหม้บนพื้นราบ และไร้มลภาวะ

บริษัท ปตท .จำกัด)มหาชน (ได้เริ่มทดลองโครงการที่จะนำก๊าซธรรมชาติมาใช้กับรถยนต์ เพื่อทดแทนน้ำมันดีเซล โดยมี วัตถุประสงค์เพื่อนำก๊าซธรรมชาติซึ่งเป็นพลังงานสะอาดมาใช้ให้เกิดประโยชน์สูงสุดทั้งแก้ปัญหาการขาดดุลการนำเข้าน้ำมัน เชื้อเพลิง และเป็นการสนับสนุน นโยบายของรัฐบาล ในการลดปัญหามลภาวะที่เกิดจากยานพาหนะ ในเขตกรุงเทพมหานคร และ ปริมณฑล

VINCIT

ทั้งนี้แบบสอบถามนี้จัดทำขึ้นเพื่อศึกษาปัจ<mark>จัยต่างๆที่มีผลต่อพถ</mark>ุติกรรมการเลือกใช้หัวซธรรมชาติ (NGV) ของผู้ขับขี่รถยนต์ ในกรุงเทพมหานคร เพื่อเป็นประโยชน์แก่การศึกษาและเป็นการเสนอแนะผู้เกี่ยวข้องในการเลือกใช้ก๊าซธรรมชาติ (NGV) ให้ได้ ประโยชน์มากที่สุด

ABOR

Assumption University College of Internet Distance Education

Questionnaire

This questionnaire is designed to obtain information for use as part of my research project entitled "Factors influencing consumer intention towards the adoption of natural gas for vehicles (NGV) in Bangkok". This study is conducted for purpose of the preparation of a research project for completion of the Master of Science in Management program.

Please answer all questions in this questionnaire and thank you for your cooperation.

Remarks: The sample of this study is drawn from people aged above 20 years old and have own car only

Part 1 To identify respondents perception towards the natural gas for vehicle (NGV)

Instruction: Please indicate your agreement on the following questions about NGV by marking

X in 🛛

1. Do you know natural gas for vehicle (NGV)?

🛛 Yes, I do 🤉

□ No, I do not (please read attached information from the last page and skip to

GABRIE

item 4)

2. How do you know NGV? (Choose more than 1)

 □ Friends
 □ Radio / Television
 □ Gas Station

 □ Government Sector / Private Sector
 □ Internet
 □ Others.....

3. Do you know that vehicles that use NGV can save approximately 70% of fuel in comparison to gasoline?

Yes, I do No, I do not

4. As cost of NGV equipment installation is Baht 25,000 – 35,000 for fumigation and Baht 48,000-53,000 for injection engine. Do you think it is

□ Too expensive □ Expensive □ Reasonable □ Cheap □ Too cheap

Part 2 Factors influencing consumers intention to use natural gas for vehicle (NGV)

Instruction: Please indicate your agreement on the following questions about NGV by marking

X in 🗆.

Eactors Influencing consumers intention	Strongly	Agree	Neutral	Disagree	Strongly
to use NGV	Agree				Disagree
to use MgA	(5)	(4)	(3)	(2)	(1)
Perceived Product Benefits	and the second		*1-		
Quality of NGV in terms of it being					
environmental friendly and not damaging					
engine	ERSI	7			
NGV can be a substitute for gasoline		1	0		
Quality of NGV tank that is safe and not	10000	C			
easily to explode	0	9			
NGV tank is not an obstacle when being	1	F 184			
installed in the vehicle		NGL	2		
NGV engine is easy to use	-	TAGA			
Maintenance of NGV engine is easy and	DIS	NY LAS			
convenience	-1-/	RIFI	2		
Perceived Cost Advantage					
Price of NGV compares to gasoline		INCIT			
Cost of NGV equipment installation	INIA		*		
Perceived Refueling Convenient	\$				
The amount of NGV service stations	~ ~ ~	59192			
reness of Promotion and Campaign	1220				
Awareness of campaign to promote NGV					
as substitution to gasoline through media					
and advertising					
1 Sufficient and accurate information from					
government & private sector that support					3
influencing to use NGV					
Social Influences					
Friends/peer group influence to use NGV					
Colleagues influence to use NGV					
	Factors Influencing consumers intention to use NGV Perceived Product Benefits Quality of NGV in terms of it being environmental friendly and not damaging engine NGV can be a substitute for gasoline Quality of NGV tank that is safe and not easily to explode NGV tank is not an obstacle when being installed in the vehicle NGV engine is easy to use Maintenance of NGV engine is easy and convenience Perceived Cost Advantage Price of NGV compares to gasoline Cost of NGV equipment installation Perceived Refueling Convenient The amount of NGV service stations reness of Promotion and Campaign Awareness of campaign to promote NGV as substitution to gasoline through media and advertising Sufficient and accurate information from government & private sector that support influencing to use NGV Colleagues influences to use NGV	Factors Influencing consumers intention to use NGVStrongly Agree (5)Perceived Product Benefits(5)Quality of NGV in terms of it being environmental friendly and not damaging engine(7)NGV can be a substitute for gasoline(7)Quality of NGV tank that is safe and not easily to explode(7)NGV tank is not an obstacle when being installed in the vehicle(7)NGV engine is easy to use(7)Maintenance of NGV engine is easy and convenience(7)Perceived Cost Advantage(7)Price of NGV compares to gasoline(7)Cost of NGV equipment installation(7)Perceived Refueling Convenient(7)The amount of NGV service stations(7)reness of Promotion and Campaign(7)Awareness of campaign to promote NGV as substitution to gasoline through media and advertising(7)Sufficient and accurate information from government & private sector that support influencing to use NGV(7)Colleagues influences(7)Friends/peer group influence to use NGV(7)	Factors influencing consumers intention to use NGV Strongly Agree (5) Agree (5) Perceived Product Benefits (4) Quality of NGV in terms of it being environmental friendly and not damaging engine (4) NGV can be a substitute for gasoline (4) Quality of NGV tank that is safe and not easily to explode (5) NGV tank is not an obstacle when being installed in the vehicle (6) NGV engine is easy to use (6) Maintenance of NGV engine is easy and convenience (7) Price of NGV compares to gasoline (7) Cost of NGV equipment installation (7) Perceived Refueling Convenient (7) The amount of NGV service stations (7) reneess of Promotion and Campaign (7) Awareness of campaign to promote NGV as substitution to gasoline through media and advertising (7) Sufficient and accurate information from government & private sector that support influencing to use NGV (7) Social Influences (7) Friends/peer group influence to use NGV (7)	Factors Influencing consumers intention to use NGVStrongly Agree (5)Agree (4)NeutralQuality of NGV in terms of it being environmental friendly and not damaging engine	Factors Influencing consumers intention to use NGVStrongly Agree (5)Agree (4)Neutral (3)Disagree (2)Perceived Product Benefits(3)(2)Quality of NGV in terms of it being environmental friendly and not damaging engine(3)(2)NGV can be a substitute for gasoline Quality of NGV tank that is safe and not easily to explode(3)(2)NGV tank is not an obstacle when being installed in the vehicle(3)(3)(2)NGV engine is easy to use(3)(3)(3)(3)Perceived Cost Advantage(3)(3)(3)(3)Price of NGV equipment installation(3)(3)(3)(3)Perceived Refueling Convenient(3)(3)(3)(3)The amount of NGV service stations reness of campaign to promote NGV as substitution to gasoline through media and advertising(3)(3)(3)Sufficient and accurate information from government & private sector that support influencing to use NGV(3)(4)(4)Friends/peer group influence to use NGV(4)(4)(4)(5)(4)

Item	Factors influencing consumers intention	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
		(3)	(4)	(3)	(2)	(1)
15	Family members influence to use NGV					
	Secondary Sources	1970 A.	an an airean a			
16	Newspaper influences to use NGV					
17	Televisions, radios, billboards, and posters influence to use NGV					
18	Internet influences to use NGV			2		
19	Information provided by gas stations	De				

Part 3 Consumers intention to use NGV

	9	Most	Likely	Unsure	Unlikely	Most			
Item	Factors influencing consumers	Likely to	to Use		to Use	Unlikely			
x.com	intention to use NGV	Use	NO			to Use			
		(5)	(4)	(3)	(2)	(1)			
1	How likely would you be to use NGV in the	DIC	5072	7					
	next 6 months	nla	Q24	A					
2	How likely would you be to use NGV if the	G1 (ABRIEL	N					
	cost of NGV equipment installation is	8 37	R	0					
	lower?		INCIT						
* OMNIA *									
	SINC	CE1969	~	>					
Pa	t 4 Personal Data	ລັຍເລັສີ	221						

			12182	100	
1. Gender			1011		
Male		🛛 Fem	nale		
2. Age					
21-25	26-	30	31-35	36-	40
41-45	46-	·50	51-55	🗖 abo	ove 55
3. Income / Mon	th				
Iess than	10,000	🛛 10,	000-20,000	2 0,	001-30,000
30,001-40	,000	40,	001-50,000	🖵 mo	re than 50,000
4. Educational Le	evel				
below bac	helor deg	jree	Bachelor	degree	above Bachelor degree

5. Occupational level

□ Student □ Employee □ Government official □ Business owner □ Other.....

*** Thank You ***

Information of Natural Gas for Vehicles (NGV)

Natural gas for vehicle or NGV comprises mostly of methane. In its natural form, NGV is lighter than air. It offers complete and clean burning in engines with lower level of emission than other fossil fuel. It is regarded as safe and environmentally friendly fuel for vehicles. It can easily be accomplished by substituting gasoline with NGV, which is potentially a cleaner burning fuel than gasoline.

National Oil Company, PTT, has initiated programs in energy conservation campaign and promotion of alternative fuels in order to help reducing deficit of oil importation and air pollution problem in Bangkok and perimeter areas.

Finally, the research is designed to obtain information which is to identify factors influencing consumer intention towards the adoption of NGV. The results of the research can be implemented to improve and develop NGV programs by related sectors in order to accomplish NGV expansion in Thailand.



Descriptive

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	90	45.0	45.0	45.0
	Female	110	55.0	55.0	100.0
	Total	200	100.0	100.0	

_			NIVE	RAge	TU	
	2	V	Frequency	Percent	Valid Percent	Cumulative Percent
ſ	Valid	21-25	20	10.0	10.0	10.0
	S	26-30	85	42.5	42.5	52.5
V		31-35	52	26.0	26.0	78.5
Æ		36-40	22	11.0	11.0	89.5
		41-45	10	5.0	5.0	94.5
		46-50	8	4.0	4.0	98.5
		51-55	3	1.5	1.5	100.0
		Total	200	100.0	100.0	
	S.	BRO	THERS of	51	ABRIEL	0N

Income

LABOR

	Income								
	*	OMNIA		*					
	×12923	Frequency	Percent	Valid Percent	Cumulative Percent				
Valid	<10,000	18	56 9.0	9.0	9.0				
	10,001-20,000		18.0	18.0	27.0				
	20,001-30,000	47	23.5	23.5	50.5				
	30,001-40,000	29	14.5	14.5	65.0				
	40,001-50,000	33	16.5	16.5	81.5				
	>50,000	37	18.5	18.5	100.0				
	Total	200	100.0	100.0					

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below bachelor	9	4.5	4.5	4.5
	Bachelor	114	57.0	57.0	61.5
	Above bachelor	77	38.5	38.5	100.0
	Total	200	100.0	100.0	

	1	NFF	20			
	UN	Frequency	Per	cent	Valid Percent	Cumulative Percent
Valid	Student	5	200	2.5	2.5	2.5
	Private Employee	157		78.5	78.5	81.0
	Government	29	-	14.5	14.5	95.5
6	Business Owner	4		2.0	2.0	97.5
	Others	A M 5	3.000	2.5	2.5	100.0
2	Total	200	L	100.0	100.0	
BROTHERS OF SI GABRIEL						

	Occupation
- 10	

AD	Respondents	know/do	not	know	NGV
AD	UK		VII	VCII	

	*	Frequency	O MNI /	Valid Percent	Cumulative Percent
Valid	Yes	192	96.0	96.0	96.0
	No	38	10 4.0	4.0	100.0
	Total	200	100.0	100.0	

Sources	of	NGV	awareness

		Respo	onses	Percent of Cases	
		Ν	Percent		
From	Friend	52	14.1%	27.1%	
	Media	164	44.6%	85.4%	
	Station	72	19.6%	37.5%	
	Paper	50	13.6%	26.0%	
	Net	25	6.8%	13.0%	
	Others	5	1.4%	2.6%	
	Total	D C 368	100.0%	191.7%	
NUNITE ON					
		se in next six m	onthe	× .	

User	II HEAT SIX IIIO	intus	1
Frequency	Percent	Valid Percent	Cumulative Percent
28	14.0	14.0	14.0
36	- 18.0	18.0	32.0
112	56.0	56.0	88.0
18	9.0	9.0	97.0
Ps 6	3.08	RIEL 3.0	100.0
200	100.0	100.0	
	Frequency 28 36 112 18 6 200	Frequency Percent 28 14.0 36 18.0 112 56.0 18 9.0 6 3.0 200 100.0	Frequency Percent Valid Percent 28 14.0 14.0 36 18.0 18.0 112 56.0 56.0 18 9.0 9.0 6 3.0 3.0 200 100.0 100.0

	I Viai	and the second sec			
	LABOR		VINCI		
*		OMNIA		*	
	×129-2		969	510Y	
	139	len	aa?		
		4 16121	El Or		Cumula
		Frequency	Percent	Valid Percent	Percer
id ni	000#00	2	1.0	1.0	

		- TOT CI C			Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	Disagree	2	1.0	1.0	1.0
	Neutral	38	19.0	19.0	20.0
	Agree	86	43.0	43.0	63.0
	Strongly Agree	74	37.0	37.0	100.0
	Total	200	100.0	100.0	

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Oil Substitution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	.5	.5	.5
	Neutral	27	13.5	13.5	14.0
	Agree	96	48.0	48.0	62.0
	Strongly Agree	76	38.0	38.0	100.0
	Total	200	100.0	100.0	

\mathbf{N}	EK.	5/7.
	Easy to	Maintenance

 \leq

Easy to Maintenance							
4	and a						
	Frequency	Percent	Valid Percent	Percent			
Valid Strongly Disagree	3	1.5	1.5	1.5			
Disagree	16	8.0	8.0	9.5			
Neutral Neutral	110	55.0	55.0	64.5			
Agree	A M 41	20.5	20.5	85.0			
Strongly Agree	30	15.0	15.0	100.0			
Total	200	c 100.0	100.0				

Safety of NGV Tank

BROTHE

ABOR

	* %	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	SINCE 1	~ 5	.5	.5
	Disagree 9	ไขาลัย	ភ័ត្ 65.5	5.5	6.0
	Neutral	86	43.0	43.0	49.0
	Agree	47	23.5	23.5	72.5
	Strongly Agree	55	27.5	27.5	100.0
	Total	200	100.0	100.0	

Size	of	NGV	Tar	ık

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	4.5	4.5	4.5
	Disagree	46	23.0	23.0	27.5
	Neutral	57	28.5	28.5	56.0
	Agree	50	25.0	25.0	81.0
	Strongly Agree	38	19.0	19.0	100.0
	Total	200	100.0	100.0	

Easy to Use Engine

		2		
0	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Strongly Disagree	2	1.0	1.0	1.0
Disagree //	8	4.0	4.0	5.0
Neutral	A M116	58.0	58.0	63.0
Agree	46	23.0	23.0	86.0
Strongly Agree	28	e 14.0	14.0	100.0
Total	200	° 100.0	100.0	
UP - DOS				

01	Price	of NCV	
01	Frice	ULINGY	

	Tota	200	> 100.0	100.0	
50	BROTHER	S of	ST GABRI	NND	
	*	O M Prie	e of NGV	*	
	18973	SINCE1 Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12192	.5	.5	.5
	Disagree	9	4.5	4.5	5.0
	Neutral	32	16.0	16.0	21.0
	Agree	95	47.5	47.5	68.5
	Strongly Agree	63	31.5	31.5	100.0
	Tota	200	100.0	100.0	

Cost of NGV	Engine	Installation
-------------	--------	--------------

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	16	8.0	8.0	8.0
	Disagree	54	27.0	27.0	35.0
	Neutral	50	25.0	25.0	60.0
	Agree	39	19.5	19.5	79.5
	Strongly Agree	41	20.5	20.5	100.0
	Total	200	100.0	100.0	

Amount of NGV Filling Station

Amount of NGV Filling Station							
	0 0	Frequency	Pe	ercent	Valid Percent	Cumulative Percent	
Valid	Strongly Disagree	16		8.0	8.0	8.0	
0	Disagree	46		23.0	23.0	31.0	
	Neutral	46		23.0	23.0	54.0	
\geq	Agree	41		20.5	20.5	74.5	
	Strongly Agree	51	0	25.5	25.5	100.0	
	Total	200	9	100.0	100.0		
BROTHERO							

LABOR Promotion and Campaign *

SSV	BROTHERS	05	SI GABRI	ND			
	Promotion and Campaign						
	* ²⁹ 73.	SINCE1 Frequency	969 Percent	Valid Percent	Cumulative Percent		
Valid	Strongly Disagree	ยาลร	26 1.5	1.5	1.5		
	Disagree	16	8.0	8.0	9.5		
4 	Neutral	35	17.5	17.5	27.0		
	Agree	114	57.0	57.0	84.0		
	Strongly Agree	32	16.0	16.0	100.0		
	Total	200	100.0	100.0			

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	3.5	3.5	3.5
	Disagree	30	15.0	15.0	18.5
	Neutral	54	27.0	27.0	45.5
	Agree	78	39.0	39.0	84.5
	Strongly Agree	31	15.5	15.5	100.0
	Total	200	100.0	100.0	

Information from Private& Government sectors

UN 1. 17

Hypothesis 1

Test of relationship between perceived product benefit and intention to use NGV

S	BROTHER	Use Next Months	6 RIE	Prod	uct
Use Next 6 Months	Pearson Correlation	SIGN	1	Y	140*
	Sig. (2-tailed)	1000	1		.048
	NABOR	VIN	200		200
Product 🖌	Pearson Correlation	A .	140*	×	₹ 1
	Sig. (2-tailed)		048	~	
9	No. SINCE	1969	200	8	200

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Hypothesis 2

Test of relationship between perceived cost advantage and NGV filling convenience, and intention to use NGV

		Correlations			
[NIVER	Use in next 6 Months	Cost Advantage	
	Use Next 6 Month	ns Pearson Correlation	1	.152*	
		Sig. (2-tailed)		.031	
	6	N	200	200	
ſ	Cost and	Pearson Correlation	.152*	1	
	Convenience	Sig. (2-tailed)	.031		
		N	200	200	
*. Correlation is significant at the 0.05 level (2-tailed).					
Hypothesis 3 Test of relationship between awareness of promotion and campaign and into to use NGV					
			Use Next 6 Months	Promotion	
	Use Next 6 Mont	ths Pearson Correlation	1	.206 **	

ention

		Months	Tomotion
Use Next 6 Months	Pearson Correlation	1	.206**
	Sig. (2-tailed)		.003
	Ν	200	200
Promotion	Pearson Correlation	.206 **	1
	Sig. (2-tailed)	.003	
	Ν	200	200

** Correlation is significant at the 0.01 level (2-tailed).

Hypothesis 4

Test of relationship between social influences and intention to use NGV

Correlations

		Use Next 6 Months	Social Norms
Use Next 6 Months	Pearson Correlation	1	.266 **
	Sig. (2-tailed)		.000
	Ν	200	200
Social Norms	Pearson Correlation	.266**	1
	Sig. (2-tailed)	.000	×
	N) ·	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

Hypothesis 5

. .

Test of relationship between secondary sources and intention to use NGV

S	BROTHERS Correlation	IS SI GABRIEL	Z
4	LABOR	Use Next 6	Secondary
Use Next 6 Months	Pearson Correlation	1	.303**
8	Sig. (2-tailed)		.000
~~	SINCE	969 200	200
Secondary Sources	S Pearson Correlation	303**	1
	Sig. (2-tailed)	.000	
	N	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

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