ANALYSIS OF CIGARETTE DEMAND OF THE INDUSTRIAL WORKERS

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จุดมุ่งหมายหลักของการทำวิจัยครั้งนี้ เพื่อหาปัจจัยที่จะช่วยแก้ปัญหาการสูบบุหรี่ให้ลดลงได้ เพราะปัญหาเกี่ยวกับการสูบบุหรี่เป็นปัญหาที่สำคัญมาก โดยเฉพาะอย่างยิ่งปัญหาที่เกิดจากผลร้ายต่อสุขภาพที่เกิดจากการได้รับควันบุหรี่เข้าไปในร่างกาย ซึ่งได้รับการแก้ไขด้วยความร่วมมือของภาครัฐบาลและภาคเอกชน โดยได้มีการกำหนดมาตรการห้ามสูบบุหรี่ที่มีผลบังคับใช้ทางกฎหมาย และนโยบายการรณรงค์ต่อต้านการสูบบุหรี่ ถึงอย่างไรก็ตามปัญหาการสูบบุหรี่ยังคงเป็นปัญหาสำคัญที่รัฐบาลต้องหามาตรการเพิ่มเติมมาช่วยแก้ปัญหาเหล่านี้ต่อไป

วิธีการศึกษาครั้งนี้เป็นการวิเคราะห์ปัจจัยที่มีอิทธิพลต่อความน่าจะเป็นของการไม่เลิกสูบบุหรี่ในอนาคต และปัจจัยที่มีผลต่ออุปสงค์บุหรี่ รวมทั้งปัจจัยที่มีผลต่อความน่าจะเป็นของการสูบบุหรี่ของคนงาน โดยทำการสัมภาษณ์คนงานในโรงงานทั้งหมด 8 แห่ง ในเขตบางขุนเทียนโดยเก็บข้อมูลจำนวน 378 ชุด และศึกษาปัจจัยที่มีผลต่อพฤติกรรมการสูบบุหรี่และการไม่เลิกสูบบุหรี่ โดยใช้การทดสอบด้วย Binary logit model และหาปัจจัยที่มีอิทธิพลต่ออุปสงค์บุหรี่ด้วย Ordinary least square ซึ่งปัจจัยที่ได้จากการวิเคราะห์แบบจำลองจะเป็นประโยชน์ในการสร้างมาตรการในการแก้ไขปัญหาเกี่ยวกับบุหรี่

ผลการศึกษาชี้ว่าระดับการรับรู้ถึงอันตรายของโรคที่เกิดจากการสูบบุหรี่มากขึ้น 1% จะมีผลทำให้อุปสงค์บุหรี่ของคนงานลดลง 2.4% ในทางกลับกัน ถ้าจำนวนชั่วโมงการทำงานต่อวันมากขึ้น 1% จะมีผลทำให้อุปสงค์บุหรี่ของคนงานมีมากขึ้น 0.5% หากคนงานสูบบุหรี่มาเป็นระยะเวลานานเท่าไรก็จะมีโอกาสสูบบุหรี่ต่อไปในอนาคตมากขึ้นเท่านั้น ถ้ารัฐบาลเพิ่มราคาบุหรี่ให้สูงขึ้นจะมีผลทำให้ปริมาณการสูบบุหรี่ต่อวันของคนงานลดลงไม่มากนักดังนั้นกลไกราคาจึงมีผลน้อยต่อคนงาน และพบว่าคนงานที่มีเงินเดือนสูงมีความน่าจะเป็นในการสูบบุหรี่น้อยกว่าคนงานที่มีเงินเดือนต่ำ ในส่วนของคนงานทุกคนที่ไม่สูบบุหรี่ในปัจจุบันนั้นจะไม่มีโอกาสสูบบุหรี่ในอนาคตแน่นอนเนื่องจากทราบว่าการสูบบุหรี่จะทำให้เกิดโรค

ข้อจำกัดของงานวิจัยชิ้นนี้มาจากระยะเวลาในการเก็บแบบสอบถามของแต่ละโรงงานเพราะจำนวนเวลาที่ทางโรงงานอนุญาตให้เข้าไปสัมภาษณ์คนงานนั้นมีไม่เพียงพอที่จะเก็บแบบสอบถามได้ครบทุกคนจึงทำให้ได้ข้อมูลจากโรงงานแต่ละที่ไม่มากเท่าที่ควร สำหรับงานวิจัยในอนาคตควรจะทำงานวิจัยเกี่ยวกับปัจจัยที่ส่งผลต่อพฤติกรรมการสูบบุหรี่ของคนงานในเขตนิคมอุตสาหกรรมอื่นๆเพิ่มเติมอีกเพื่อให้เกิดความครบถ้วนของหัวข้องานทางด้านพฤติกรรมการสูบบุหรี่ของคนงาน

สาขาวิชา....เศรษฐศาสตร์สาธารณสุข..... **ลายมือชื่อนิสิต**.....

ปีการศึกษา....2547..... **ลายมือชื่ออาจารย์ที่ปรึกษา**.....

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KEY WARD: ANALYSIS / CIGARETTE DEMAND / INDUSTRIAL WORKERS

ATCHARA PONGPATTANANUKUL: ANALYSIS OF CIGARETTE DEMAND OF THE INDUSTRIAL WORKERS**.** THESIS ADVISOR: ASSOC. PROF. ISRA SARNTISART, PH.D., 93 pp. ISBN 974-17-6447-2.

The main goal of this research was to study the factors which will lead to decrease the smoking prevalence rate. Since smoking is a vital problem with which most people feel concerned, especially due to its widely known adverse effects to health, various smoking control measures have been supported by the Thai government and many private organizations. Some of these control measures have included issuing legal measures to discourage smoking and holding anti-smoking campaigns. Yet, smoking is still a major problem these days, despite many new regulations.

This study concentrates on analyzing the significant factors that effect on the probability of continue to smoke, demand for cigarettes of smokers and the probability of smoking of workers. The research has been conducted by surveying 378 industrial workers from eight industries in Bang Khun Thian district, Bangkok Metropolis. In order to determine the significant factors affecting the cigarette demand, the collected data were analyzed by the ordinary least square. The binary logistic regression was also applied to find out the significant factors affecting the probability of continue to smoke and the probability of cigarette smoking. The analysis results provide some useful information to the government for creating effective regulation to reduce the smoking prevalence rate.

The study showed that a 1% increase in the degree of disease awareness can induce a 2.4% decrease in the demand for cigarettes. On the other side, a 1% increase in work hour leads to a 0.5% increase in cigarette demand. Moreover, the longer smokers have been smoking, the less probability of quitting smoking in the future. Unfortunately, for industrial workers, the price mechanism does not work. Simply raising the price of cigarettes does little to reduce the amount of cigarettes smoked by them. Moreover, the income is not a significant factor. But result indicates that highly paid workers have less probability of cigarette smoking than the lowly paid workers. However, the difference is very small. Finally, it should be added that all of the nonsmokers questioned have definitely decided not try to smoke in the future because they have recognized that cigarette smoking causes many diseases.

However, it should be noted that this study was completed within a limited time, so it was impossible to interview all workers in every factory. It would be recommended that future studies cover other industrial areas, and with more collected information, the results would be more accurate and insightful.

Field of study…...Health Economics……. **Student's signature**…….....

Academic year….2004…….. **Advisor's signature**……

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CHAPTER 1

INTRODUCTION

1.1 Rationale

The main goal of this research is to determine the factors which would effectively curb the amount of smoking and reduce the smoking prevalence rate of industrial workers, since smoking is one of problems with which they are most concerned. Though both the Thai government and private organizations have initiated many anti-smoking campaigns and have issued a variety of measures to discourage smoking, cigarette smoking is still a major problem that urgently needs to be addressed.

It has been widely recognized that smoking is responsible for many deaths among Thai people, as smoking increases the risk of dying from lung cancer, emphysema and chronic obstructive pulmonary disease, which are the top three most harmful diseases in Thailand. Moreover, it is not only smokers who experience more health-related risks but also those who are exposed to second-hand smoke that are more likely to be affected by these illnesses.

On top of all these health effects, smoking also causes many social problems. The government spends a substantial amount of money each year helping patients with smoking-related diseases even though these problems are self-inflicted and avoidable by not smoking.

In an attempt to curb the amount of smoking, the government has taken many measures to discourage smoking by launching an anti-smoking campaign, by informing the public about the adverse effects of smoking and by enacting two regulations in 1992: the Tobacco Production Control Act and the Non-smokers Health Protection Act.

The main objectives of the Tobacco Production Control Act of 1992 are:

a) To prohibit the selling or providing of tobacco products to any person under 18 years of age.

b) To prohibit the selling of tobacco products via vending machines in order to limit the temptation and ease of minors obtaining them.

c) To prohibit the advertisement of tobacco products in any media, including newspapers, television, radio, magazines and outdoor signs displayed at racing tournaments.

d) To require tobacco manufacturers to notify the Ministry of Public Health of all the ingredients in their products to address concerns about health standards.

e) To require tobacco manufacturers to print warning labels on cigarettes packages.

f) To prohibit producing, importing, advertising or distributing packages resembling cigarette packages (e.g. chewing gum packages produced to look like brand name cigarette packages).

The main objectives of the Non-smokers' Health Protection Act of 1992 are:

a) To set aside non-smoking sections in all public places.
b) To ensure that non-smoking areas fulfill all conditions and standards regulated by the Minister of Public Health.
c) To require that no smoking signs be posted in non-smoking areas to identify their status.
d) To prohibit all people from smoking in any non-smoking areas.
e) To give the Public Health Minister full authority to inspect any tobacco manufacturer between sunrise and sunset in order to enforce the Act.

Many private groups and organizations have joined the government in discouraging people from smoking. Although the government has initiated many anti-smoking campaigns, the government is also a primary tobacco manufacturer and legally supplies cigarettes throughout the country. This conflict of interest, suggested a mixed stance on smoking, does not help the issue.

While the government does earn revenues from cigarettes by collecting excise taxes and other related fees, it also experiences a great deal of losses as a result of cigarettes. Considering that over 40,000 million Baht was spent by government in 2000 on health care costs for smoking-related diseases (Isra, 2003, p. 6), it is clear that this is a major issue that needs to be addressed. Even when we just consider the costs for the treatment of lung cancer and chronic obstructive pulmonary diseases, which are strongly linked to smoking, treating these diseases accounted for about 0.1% (248.808 million Baht) of total health care expenditures (Isra, 2003). These are only two of the many diseases that are directly associated with smoking; there are still many others diseases that are known to be linked to tobacco consumption. Two of the top three causes of death in Thailand are heart disease and malignant neoplasm, which are often connected to smoking. According to a survey conducted in 2000, it was found that the amount of deaths caused by these diseases had risen sharply to 92 out of every 10,000, as compared with 61 in 1992 (Isra, 2003).

The facts that treating smoking related illnesses is costly and that health care expenses outweigh the revenues gained from cigarette taxes have been supported by many research studies worldwide. According to a study done by the Congressional Research Service (CRS) (1983, in Prakit 1994, p. 66-67), the amount of money spent on curing cigarette-related illnesses was 2.47 times as much as the tax revenues gained and the cost of lives lost prematurely was 4.83 times as much. Importantly, these figures do not include the losses in terms of

the devastation and grief of the families, which is as immeasurable as the value of the lives lost due to smoking.

Moreover, the environment is adversely affected when forest space is used for growing and curing tobacco plants. Since most smokers are low-wage workers who can hardly make ends meet, it would seem that they are less capable of affording basic consumer goods if they are continually purchasing cigarettes. In the long term, as the productivity of the labor force decreases as a result of health problems, we may eventually see a slow down in economic growth.

Between 1999 and 2001, the prevalence of smoking among people within the Bangkok metropolitan area and the northeastern region of Thailand increased while the prevalence in other regions decreased (see Table 1.1). These results may seem surprising since the residents of Bangkok are considered the most well-informed group with regards to such issues as the dangers of smoking. As the target group of most anti-smoking campaigns and regulations, Bangkok population are the ones who are most aware of its disadvantages. This implies that past campaigns and legal measures were not as effective as originally expected. It is necessary, therefore, for the government to improve its policy against tobacco usage.

Table 1.1: Smoking prevalence among people who are over 15 years of age sort by the regions, 1999&2001.

Year	Whole Kingdom	Bangkok Metropolis	Central Region (excluding Bangkok)	Northern Region	Northeastern Region	Southern region
1999	22.4%	15.5%	20.9%	23.6%	24.5%	25.6%
2001	22.5%	15.7%	19.9%	23.5%	25.7%	24.4%
Percentage change	+0.1%	+0.2%	-0.1%	-0.1%	+1.2%	-1.2%

Note: the smoking prevalence is extracted from people over 15 years of age at least in the same region.
Source: The prime minister, office. National statistical office. (1996). Report of the cigarette smoking behavior survey.
The prime minister, office. National statistical office. (1999). Report of the cigarette smoking and alcoholic drinking behavior survey.

Classified by age, the group of Bangkok population between the ages of 25-59 years old has the highest smoking prevalence rate (21.38%), while the group of people over 60 years of age has the lowest rate (9.36%). The

prevalence among the 15-24 year old group is 11.63%. Also, it has been found that the prevalence of smoking among people within the Bangkok metropolitan area increases with age, reaching its highest rate, nearly 23%, among 35-39 year olds before starting to drop gradually (see Table 1.2 and Table 1.3).

Table 1.2: Number of smokers and percent of smoking prevalence among people over 15 years of age sort by age, Bangkok Metropolis.

Age group (years old)	Total		
	Population(000s)	Smoker(000s)	Smoking prevalence
15-24	1,487.3	172.9	11.63%
25-59	4,215.2	901	21.38%
> 60	599.4	56.1	9.36%
Total	6,301.9	1,130.0	17.93%

Source: The prime minister, office. National statistical office. (2001). Report of the cigarette smoking and alcoholic drinking behavior survey. 50p.

Table 1.3: The number of smokers and percentage of smoking prevalence among people over 15 years of age sort by age at length, Bangkok Metropolis**.**

Age group (years old)	Total		
	Population (000s)	Smoker (000s)	Smoking prevalence
15-19	679.5	37.0	5.45%
20-24	807.8	135.9	16.82%
25-29	869.2	175.3	20.17%
30-34	835.0	187.3	22.43%
35-39	727.6	169.8	23.34%
40-49	1,145.4	251.7	21.97%
50-59	638.0	116.9	18.32%
> 60	599.4	56.1	9.36%

Source: The prime minister, office. National statistical office. (2001). Report of the cigarette smoking and alcoholic drinking behavior survey. 50p, table2.1.

Table 1.4 shows that employees who work in the fields of machinery and agricultural were found to be the highest ranked in terms of smoking prevalence with about 33.4% and 31.1% respectively, while other occupations had lower rates; professionals was the lowest with 8.7%.

Table 1.4: Number of smokers and percent of smoking prevalence among people over 15 years of age sort by occupation, Bangkok Metropolis**.**

Occupation	Population (000s)	Smoker (000s)	Smoking prevalence
Total	3738.27	848.7	22.7%
Legislators, senior officials and managers	371.48	100.3	27%
Professionals	220.69	19.2	8.7%
Technicians and associate professionals	382.10	61.9	16.2%
Clerks	320.35	36.2	11.3%
Service workers and shop and market sales workers	970.97	150.5	15.5%
Skilled agricultural and fishery workers	33.12	10.3	31.1%
Craft and related trades workers	567.58	187.3	33%
Plant and machine operators and assemblers	566.77	189.3	33.4%
Elementary occupations	305.21	93.7	30.7%

Source: The prime minister, office. National statistical office. (2001). Report of the cigarette smoking and alcoholic drinking behavior survey. 68p, table5.1. 13p, table5.

To gain correct and useful information, the chosen sample must be significant. In Table 1.5, the data shows that Bang Khun Thian district has the highest number of industrial workers, so this district is considered a good representative sample of all industrial workers. Moreover, according to the statistical data from the Office of Bangkok Policy Planning gathered in 1999, Bang Khun Thian district was ranked number two (of all districts that have factories registered) after Khet Bang Bon, where 1,371 factories are located. In Bang Khun Thian, there were 1,337 factories that had been registered in 1999 and the average number of workers in each factory was 35.

Table 1.5: Number and percent of workers sort by industrial factories establishment within Bangkok Metropolis conduct in 2002.

Order	District	Number of workers(person)
1	Bang Khun Thian	49,338
2	Lat Krabang	37,592
3	Bang Bon	36,663

Source: Industrial works, department. Information center. Data update 28 july 2003.

Table 1.5: Number and percent of workers sort by industrial factories establishment within Bangkok Metropolis conduct in 2002. (Continued 1)

Order	District	Number of workers (person)
4	Chom Thong	23,552
5	Rat Burana	23,238
6	Yan Nawa	22,602
7	Nong Khaem	22,358
8	Bang Khae	20,739
9	Bang Kho Laem	19,907
10	Phasi Charoen	19,315
11	Min Buri	17,887
12	Phra Khanong	15,784
13	Bang Na	15,656
14	Thung Khru	14,876
15	Prawet	14,851
16	Bang Kapi	14,499
17	Khlong Toei	13,785
18	Klongsan	13,682
19	Sathorn	11,374
20	Suan Luang	10,415
21	Thon Buri	10,357
22	Wang Thonglang	9,713
23	Bangkok Yai	9,552
24	Lak Si	9,451
25	Don Mueang	9,062
26	Chatuchak	8,965
27	Khan Na Yao	7,673
28	Huai Khwang	7,382
29	Bang Sue	6,490
30	Bang Rak	6,343
31	Bang Khen	5,949

Source: Industrial works, department. Information center. Data update 28 july 2003.

Table 1.5: Number and percent of workers sort by industrial factories establishment within Bangkok Metropolis conduct in 2002. (Continued 2)

Order	District	Number of workers(person)
32	Bang Phlat	5,933
33	Nong Chok	5,659
34	Khlong Sam Wa	5,383
35	Bueng Kum	5,347
36	Bangkok Noi	4,795
37	Vadhana	4,729
38	Ratchathewi	4,694
39	Din Daeng	3,243
40	Pom Prap Sattru Phai	3,178
41	Lat Phroa	3,118
42	Dusit	3,038
43	Taling Chan	2,998
44	Pathum Wan	2,995
45	Phra Nakhon	2,695
46	Phaya Thai	2,637
47	Sai Mai	2,278
48	Saphan Sung	1,750
49	Thawi Watthana	1,634
50	Samphanthawong	1,073
Total		576,227

Source: Industrial works, department. Information center. Data update 28 july 2003.

1.2 Research question

What are factors affecting cigarette demand and smoking behavior of workers? How should government utilize them to create beneficial measures to reduce the number of smokers?

1.3 Objectives

a) Analyze significant factors affecting the probability of continue to smoke, study their direction and magnitude.

b) Study significant factors affecting cigarette demand and study the magnitude and direction between the quantity of cigarette smoking per day and such factors.

c) Analyze significant factors which effect on the probability of smoking, also study magnitude and direction.

1.4 Scopes of the study

Target population is industrial workers at Bang Khun Thian district of Bangkok Metropolis. The analysis is based on 378 questionnaires collected from 8 difference plants in Bang Khun Thian district.

1.5 Expected benefit

a) The government can design targeted policies to curb the amount of smoking.

b) The policy makers can create some effective regulations to reduce the smoking prevalence rate.

c) Successful measures can be developed to reduce the number of smokers.

From this research, the government contributes the factors that relate to the smoking behaviors of workers and offer practical strategies to employers, employees and entrepreneurs to decrease the smoking prevalence rate and thereby provide a major service to the country.

It should be noted that this research was conducted with a specific target group, industrial workers. In order to design the most practical and effective strategies to address this problem, the government needs to collect further data as a way to better comprehend the broader picture. This research is an important step in the right direction and will be useful in the context of additional studies covering other demographic segments of Thailand.

CHAPTER 2

LITERATURE REVIEW

To find effective solutions to issue of smoking, many past studies have attempted to examine factors in regard to smoking behavior and smoking cessation methods. Much research has been conducted on this topic, and some of this research has been very useful for this study aiming to shed light on ways to curb smoking specifically among industrial workers.

After reviewing much research and theses concerned with the factors that cause people to smoke, it became clear that there are many issues to consider when exploring the factors that affect their smoking behavior and how someone is becomes an addicted smoker. The following sections include some interesting and helpful information from my research.

Psychological analyzes of smoker's behavior have shown that the primary reason why people "need" to smoke a cigarette is due to one or more of these factors: inner and outer motivations, hereditary and personality.

a) Inner Motivation

People's inner motivations and feelings, especially when they are confronted with negative emotions, are very important factors to consider when trying to understand what drives people to smoke,. Today people often live and work in a competitive and stressful environment in which a cigarette is viewed as a means for relaxing. These feelings may also stem from a rapidly changing or unstable environment. When some people feel insecure, awkward, agitated, unpleasant or concerned, they may find (or think that they find) calmness and escape in lighting up a cigarette. For other, with a cigarette in their hand, they feel more confident, and often among younger individual, the idea of smoking is associated with rebelling, receiving social acceptance and being "cool."

b) External Motivation

There are many indirect motivations which lead people to smoke. Some studies have found that, when someone lives with a smoker since childhood, that person has a greater likelihood of becoming a smoker as well. Likewise, celebrities and other role models have a major influence over people and can inadvertently glamorize smoking. The wide availability and relative low cost of cigarettes in most countries makes them easily accessible to most people. In recent years, though, governments have begun to recognize these external motivators and have taken stronger actions to restrict tobacco purchases, to protect non-smokers' health and to limit the freedom of tobacco companies to publicize in the media.

c) Hereditary and Personality

By definition, hereditary is the transmission of biological traits from parents to offspring through genes. Some research has looked at whether cigarette addiction can be passed on from parents to their children, since similar connections were shown with children inheriting alcohol-related problems from their parents. Related to this, some research also suggests that some specific personality characteristics can be found in smokers. These studies have consistently stated that the personality of smokers and non-smokers may be significantly different. According to Supa's study (1983), smokers may have personalities traits which include being reckless, straightforward, enthusiastic and rebellious. Others were found to be quite serious, paranoid, temperamental and prone to nervous.

In order to divide the reasons that cause people to smoke into different categories, Songlor (1984) found that the four basic reasons for smoking are to energize, to feel secure, to ease stress and to satisfy a craving for nicotine.

Smokers often claim that they feel much more active after they have smoked so they can work harder and longer. Eventually after a long time, the craving for the cigarettes and this feeling is so great that it becomes difficult to stop smoking. Moreover, some smokers feel more comfortable and confident just by having a cigarette in their hand. Without a cigarette, they may feel awkward, nervous and unsure of what to do. Many of these people may feel uneasy with unfamiliar social activities.

Some people believe that smoking helps to make them relax. Whenever they are tense and reckless, they use cigarette to ease off tension because its effects as a stimulant drug directly act on the central nervous system. The most crucial chemical to create this feeling is nicotine which is found naturally in the tobacco leaf. Like many other drugs, after repeated usage, it is hard to give up. In a study by Mayuree (1991) to research knowledge, attitudes and smoking behavior of male students at Chulalongkorn University in 1990, it was found that smokers who have already become addicted to nicotine might have a more difficult time quitting compared to others who are not yet addicted. When these addicted smokers stop smoking, they become physically uncomfortable and sometimes feel restless. People who are addicted to nicotine at this level are termed a heavy-smoker. For them, smoking cessation is unlikely.

The progression and of a non-regular smoker to a regular or heavy smoker does not suddenly happen but it gradually occurs, sometimes taking a few years. Many researchers have examined how this transformation comes about. Snyder (1989, in Jutarat 1998) concluded that there are five steps in socio-psychology to explain how a smoking habit progresses.

Step 1 – Initiation: An individual's true cognition and attitude toward cigarettes is the most basic psychological factor that pushes them to start smoking. If the people around the non-smoker agree that the habit is a hazard to health, then it is unlikely that the individual will try smoking without some initial hesitation. However, if this attitude of danger does not surround the individual, then he/she will be more inclined to try smoking. It is essential, therefore, to provide the correct information to people about the harmful nature of cigarettes. This is especially true for youth who are more easily influenced by role models like their parents, teachers, celebrities and even the leaders of their country.

Step 2 – Trial: There are many psychological factors that urge people to try their first cigarette. In many cases, people try it out of curiosity. Others, such as teenagers, are pressured by their friends to try a cigarette and want social approval. Some are challenged to smoke and don't know how to refuse, while others do it because smoking is seen as a symbol of maturity and freedom. However, the most disconcerting group of individuals who start smoking are the ones who, in spite of knowing the disadvantages of smoking, still decide to try smoking anyway simply as a way to rebel against society. The trial stage is very critical one since the next stage is when they become addicted.

Step 3 – Addiction: A non-regular smoker will transform into an addicted smoker because of two basic causes. The first cause is socio-psychological needs, like the desire to be socially accepted. The other cause is physical needs, since nicotine is an addictive substance. Smokers will crave for a cigarette and feel agitated when they cannot smoke or have not smoked in a while.

Step 4 – Attempts to Quit: Like step three, this step is also the result of both socio-psychological and physical drives. As smokers sense their health deteriorating, they are more likely to become concerned about diseases and their overall well-being. Anti-smoking campaigns and social encouragement may also have some sway over them to consider giving up the habit. However, the addition at this stage may be quite strong and may outweigh these socio-psychological drives to quit.

Step 5 – Continuation of Habit: With or without step four, nicotine addition and the negative feeling associated with nicotine deprivation are the most critical factors that cause people continue to smoke. This proves how badly nicotine affects smokers. Yet, psychological causes cannot be completely discarded. Stress, tension, social pressure or even lack of self-control could encourage the continuation of the habit as well.

This five steps progression has been supported by many research studies, like those done by Baugh (Baugh, et al 1982: 1161) and Jureerat

Bawornwattanuwongs (non-smoking campaign 1988: 3 refer in Orathai Limtrakul thesis 1991: 15-16). In summary, the transformation has to be made up of at least four steps, and within each step, there are different ways in which nicotine becomes quite significant.

In addition to reviewing past studies about why people decide to begin smoking and how non-smokers can be transformed into addicts, there are factors to determine the quantity of cigarettes smoked, such as age, sex, monthly income, the price of cigarettes, the number of years smoking, the degree of awareness of the danger, the cognition or attitude towards smoking and the enforcement of the tobacco related acts in Thailand.

Age: Many studies have confirmed that the amount of cigarettes smoked is closely related to the smoker's age. It is likely that smoking prevalence increases as people get older. Isra (2003), who performed an economic analysis of tobacco control in Thailand, found that smoking prevalence increases to its highest rate (about 31.15%) by middle age and then declines. However, in regard to cigarette demand and a 1% price rise, the study showed that the 30-39 year old age group is the most sensitive group, with about a 0.46% fall, followed by the age groups of 18-29, 8-18, 50-59 and 40-49 respectively in descending order. It seems that maturity, price and the realization in later life of smoking's harmful affects on health influence older people to smoke less. This information about the older age group being more price sensitive than the younger one is somewhat surprising and indicates that a correlation between age and smoking is negatively assumed.

It should be noted, though that the age group over 60 is unresponsive to price changes, in spite of the fact that the income for older people may be less than it is for younger people. According to this, a correlation between demand for cigarettes and 1% price rise is positive except for in times of economic recession. Therefore, increasing the price of cigarettes is way to control the amount of smoking among people in the middle-aged group.

Kongkiet (1996) conducted research on personal demand for cigarette as a cross sectional study including the Bangkok Metropolitan area and its vicinities. The study found that a correlation between the age and the quantity of cigarettes smoked is negative. However, when it is compared with the number of years smoking, the correlation is positive. In spite of the fact that people who have been smoking for a longer time are more likely to be addicted, surprisingly the study showed that older people smoke less, which is probably a result of their cognition of the health hazardous associated with smoking. Additionally, they may have more responsibilities which encourage them to smoke less or may begin to feel the adverse physical effects resulting from years of smoking.

Furthermore, Jutarat's study (1998) on smoking behavior and the opinions of Sirindhorn College of Public Health students concerning the enforcement of the Non-smokers' Health Protection Act of 1992 established a negative correlation between age and the quantity of cigarettes and offered similar results to the Kongkiet study.

Sex: A large number of studies confirmed consistently that sex was closely related to smoking behavior. It seems that men have a higher tendency to smoke but it is an easier habit for them to quit.

According to a National Statistical Office survey, it was found that 45.43% of smokers are male and only 2.96% are female. Also, research conducted by Ohio State University found that methods to quit smoking were more effective on men than women. The study revealed that around 30% of men who used the particular treatment could quit smoking successfully, as compared with around 23% of women. Nicotine replacement therapy was not as effective for women as it was for men, and one concern that women had about quitting smoking was the potential for weight gain.

Also, research from Texas A&M University supports this conclusion. A study there showed that in comparison to men, women are more likely to crave cigarettes and to enjoy the olfactory and hand to mouth sensations associated with smoking. Smoking was also found to be used by women as a way to improve their social interactions, ease their stress and prevent weight gain.

Monthly income: According to some studies, elasticity of income, which varies from place to place, affects smoking behavior and demand. Isra (1995) attempted to use a log-linear model and national-level data to analyze aggregated tobacco consumption and found that the demand for cigarettes was inelastic. The average elasticity of demand was 0.359. According to this, it was implied that a 10% rise in income leads to a 3.59% increase in demand.

Kongkiet (1996) focused on individual demand for cigarettes from cross sectional data in Bangkok in 1994 and found that the elasticity was 0.047. The study by Surangrat (1997) specified the demand in other regions of Thailand by using time series data collected from 1977 to 1996 and found that the elasticity was 0.462, which was considerably different from Kongkiet's results.

Cigarette price: Isra (1995) found that an average price elasticity of demand was -0.666 which means that every 10% rise in prices (by an increase in the tax rate, for example) could decrease demand by 7%.

The number of years smoking: One study indicated that the longer people smoke, the more likely they are to increase their quantity of cigarettes they smoke. The study by Kongkiet (1996) found that a correlation between the number of years smoking and increases in the quantity of cigarettes to be

positive. Moreover, it's widely accepted that the number of years that someone smokes is an indicator of the degree of tobacco addiction.

Degree of awareness of diseases: Results of many studies have shown that awareness of the dangers caused by smoking affect smoking behavior. One of significant factors which make smokers quit smoking is the perception about the risks of smoking to their health. With this awareness, some people even might try to avoid any activities involving smoking. When people realize the dangers and disadvantages of smoking, they were more likely to find ways to care for their health. Every study showed that the important motivation for quitting was rarely different. Patraporn (1995) examined a peer education program and found that having knowledge about the danger of smoking lead smokers to quit. Also, a study by Sairoong (1995) of smoking cessation behavior among technical college students at Petchabun Technical College mentioned that the most important reason for smoking cessation is the fear about the dangers. Moreover, Densurang's study (1995) showed how beliefs and behavior changed after smokers receiving phone counseling. According to Kamraithip Ranoi's study (Kamraithip Ranoi, 1993), the degree of awareness about health hazards due to smoking relates significantly to the probability of smoking cessation.

Cognition or attitude toward cigarettes: A number of studies showed that smoking behavior was strongly related to individuals' beliefs. Beliefs are correlated with attitude and directly affect personal behavior and emotions. When humans have a particular feeling about something, whether it be objects or situations, they tend to believe firmly in it. Since human behaviors are often based on their beliefs, this factor is very significant. A study by Sompob (1995) on the factors affecting smoking habits of health center staff showed that the staff's beliefs about cigarettes had a connection with their smoking behaviors. Additionally, a study by Nittra (1996) on smoking cessation programs among students of Kanchanaburi Technical College noted that obtaining correct beliefs and attitudes about cigarettes could help smokers reduce their daily quantity of cigarettes. However, Nittaya (1995) examined the effect of empowering education in prevention programs for secondary school students and found that friends are the most significant factor affecting smoking.

Realization of the enforcement of the Non-Smokers' Health Protection Act of 1992: Many studies on the effects of recognition about the Non-Smokers' Health Protection Act of 1992 found that acknowledgement of the regulations and the fines for punishment affected smoking behavior somewhat. A study by Khanittha (1994) among high school students showed that knowing and abiding by the Act in practice could affect the behavior of both smokers and non-smokers. A study by Pojamart (1992) among male smokers, it was found that the regulations of the Bangkok Royal Act influenced the behavior of smokers. Furthermore, research by Sanguan, Sumaporn,

Suchada, Niyana & Nowarat (1992) on non-smokers' health protection in public places conducted in Bangkok provided similar results. According to a study by Aim-On (1998) on the perception and behavior of Thais towards smoking in public places, it is clear that most smokers abide by the act.

Isra (2003) stated that in Thailand many important measures had been designed to reduce smoking. These measures include the prohibition of advertisements for tobacco products, the prohibition of smoking in various public places and the prohibition on the sale of tobacco products to children under 18 years of age. While the measures have received wide public support, their effectiveness is heavily dependent on the extent of compliance and enforcement in spite of loopholes. Unfortunately, some survey results have shown that these measures have not been fully effective.

From the relevant literature, there is a multitude of useful information to contribute towards solving the smoking problem. Yet there is not enough in the way of information for planning effective guidelines for reducing smoking prevalence in the future. It's necessary to extend the examination on both direction and magnitude of impact from each independent variable. Moreover, there should be more in-depth studies on other factors, such as the number of hours worked, the highest price that smokers are willing to pay for a pack of cigarettes, the highest fine that a smoker can afford and how providing non-smoking areas in work place affect smoking behavior. As a result of studying these factors seriously, more effective solutions could potentially be created to solve the smoking problem, which is the main goal of this thesis.

CHAPTER 3

STUDYING METHOD AND MODELS

3.1 Data source

3.1.1 Population and sample

Target Population: Industrial workers at Bang Khun Tian district

Sampling population: industrial workers at Samae Dam subdistrict, where the number of workers represents 88% of the total workers in all of Bang Khun Thian district (as compared with Tha Kham subdistrict representing approximately 12%) (see Table 3.1).

Sampling area: Samae Dam subdistrict.

Table3.1: Number and percent of workers in each subdistrict of Bang Khun Thian district.

Subdistrict	Number of workers (persons)	Percentage of workers
Tha Kham	6,232.00	12.54%
Samae Dam	43,447.00	87.46%
Total	49,679.00	100.00%

Source: Industrial works, department. Information center. Data update 28 july 2003**.**

Sample size calculation: to identify the sample size, a formulation of Taro Yamane (Yamane, 1973) is applied based on a finite population. For the precision of random sampling to be 5.1%, a sample size of 378 people is needed for this study based on the formula:

$$n = \frac{N}{1 + Ne^2}$$

where n = sample size. (persons)
N = population size. (i.e. number of industrial workers in Bang Khun Tian district (persons))
e = precision of random sampling.

Since the population is 49,338 (see Table 1.5) and the precision of random sampling has been specified at 5.1%, the sample size is found by:

N = 49,338 and e = 0.051

therefore, $$n = \frac{49,338}{1 + 49,338\ (0.051)^2} = 378 \text{ persons}$$

Sampling Technique: Proportional sampling.

Table 3.2: Sample size for each group.

Group	Industrial code*	Menufacturing	Total number	Total(%)	Total number of workers (group)	Total(%) (group)	Sample size (persons)	Sampling industry
Total			43,447	100.00	43,447	100.00	378	
1	$16_{\text{category59-60}}$	Basic metal products	562	1.29	6,193	14.25	54	T.P.N steel group co., ltd. Manufacturer of steel product for construction.
	$17_{\text{category61-64,104}}$	Fabricated products	5,631	12.96				
2	$4_{\text{category22-27}}$	Textile	5,231	12.04	5,231	12.04	45	Jong Sati co,. ltd. Manufacturer of spinning cotton thread.
3	$18_{\text{category 65-70}}$	Machinery	641	1.48	6,007	13.83	52	Thai Peng Factory Manufacturer of rivet
	$19_{\text{category71-74,107}}$	Electrical machinery&supplies	1,447	3.33				
	$20_{\text{category 75-80,95}}$	Transport equipment	823	1.89				
	$21_{\text{category 3,21,81-94,96-103,105,106}}$	Other manufacturing industries	3,096	7.13				

Source: Department of industrial works.
*See appendixII.

Table 3.2: Sample size for each group. (Continued)

Group	Industrial code*	Menufacturing	Total number	Total(%)	Total number of workers (group)	Total(%) (group)	Sample size (persons)	Sampling industry
4	$7_{category34-36}$	Wood & wood products	834	1.92	4,325	9.96	38	Thai Catons co., ltd. Manufacturer of paper and cardboard
	$8_{category37}$	Furniture&fixture	1,376	3.17				
	$9_{category38-40}$	paper & paper products	1,120	2.58				
5	$10_{category41}$	Printing,publishing, allied products	995	2.29	2,485	5.72	22	T-M Pharma ltd. Manufacturer of medicine
	$11_{category42-48}$	Chemical& chemical products	991	2.28				
	$13_{category 51-52}$	Rubber products	1,132	2.61				
	$14_{category 53}$	Non-metal products	362	0.83				
6	$15_{category 54-58}$	Plastic products	5,964	13.73	5,964	13.73	52	Narai co.,ltd. Manufacturer of plastic bag
7	$5_{category28}$	Wearing apparel	4,535	10.44	7,356	16.93	64	Romar Industrial co., ltd. Manufacturer of bags
	$6_{category29-33}$	Leather products &foodwear	2,821	6.49				
8	$1_{category1,2,9}$	Basic agroindustry	87	0.20	5,886	13.58	51	Mae Ruay Factory Manufacturer of baked bean
	$2_{category4-8\ ,\ 10-15}$	Food	5,769	13.28				
	$3_{category16-20}$	Beverage	30	0.07				

Source: Department of industrial works.
*See appendixIV.

3.1.2 Collecting data

This researcher paid careful attention to acquiring data that will produce correct and useful information for further analysis. By classifying business types of all industrial factories in the district, it was found that there are eight main categories. Then, one factory from each group was chosen using a random sampling method to represent that category (see Table 1.6).

The industrial workers selected for interviews were also chosen with a random sampling method. The interviewers, who were trained carefully, had never met the interviewees and always kept mindful of monitoring all interviewees carefully and under the same standards to minimize researcher bias.

The interview process began with asking the worker to provide his/her workplace details. Next, the interviewee was asked whether he/she smokes at present. Those who replied “yes” were asked a different set of questions than those who replied “no.” Both groups were asked for details about age, sex, monthly income, amount of smoking per year, degree of awareness about health hazards due to smoking, working hours, cognition or attitude towards cigarettes, realization of the enforcement of the Non-smokers Health Protection Act of 1992 and education level. Smokers were asked about the highest price that they would be willing to pay for a pack of cigarettes, the highest fine that they would be willing to pay to smoke in a non-smoking area, and whether there were non-smoking areas in their work places. For those who responded as non-smokers, they were not asked the prior three questions, and they were also not asked about the amount of smoking per year.

Additionally, smokers were asked if they planned to quit in the future and what their reasons were for planning to stop or to continue. Non-smokers were questioned about whether they had any intention to try smoking in the near future and about their reasons for deciding to do so or not. Moreover, all interviewees were asked about the factors that affect their perceptions about smoking, their reasons for quitting or trying cigarettes and their smoking behaviors. Examples of the key factors mentioned are: a non-smoking area in the workplace, the prohibition of smoking during work, the effects of reducing work hours and the maximum fine one is willing to pay to violate a factory regulation.

3.1.3 Questionnaire

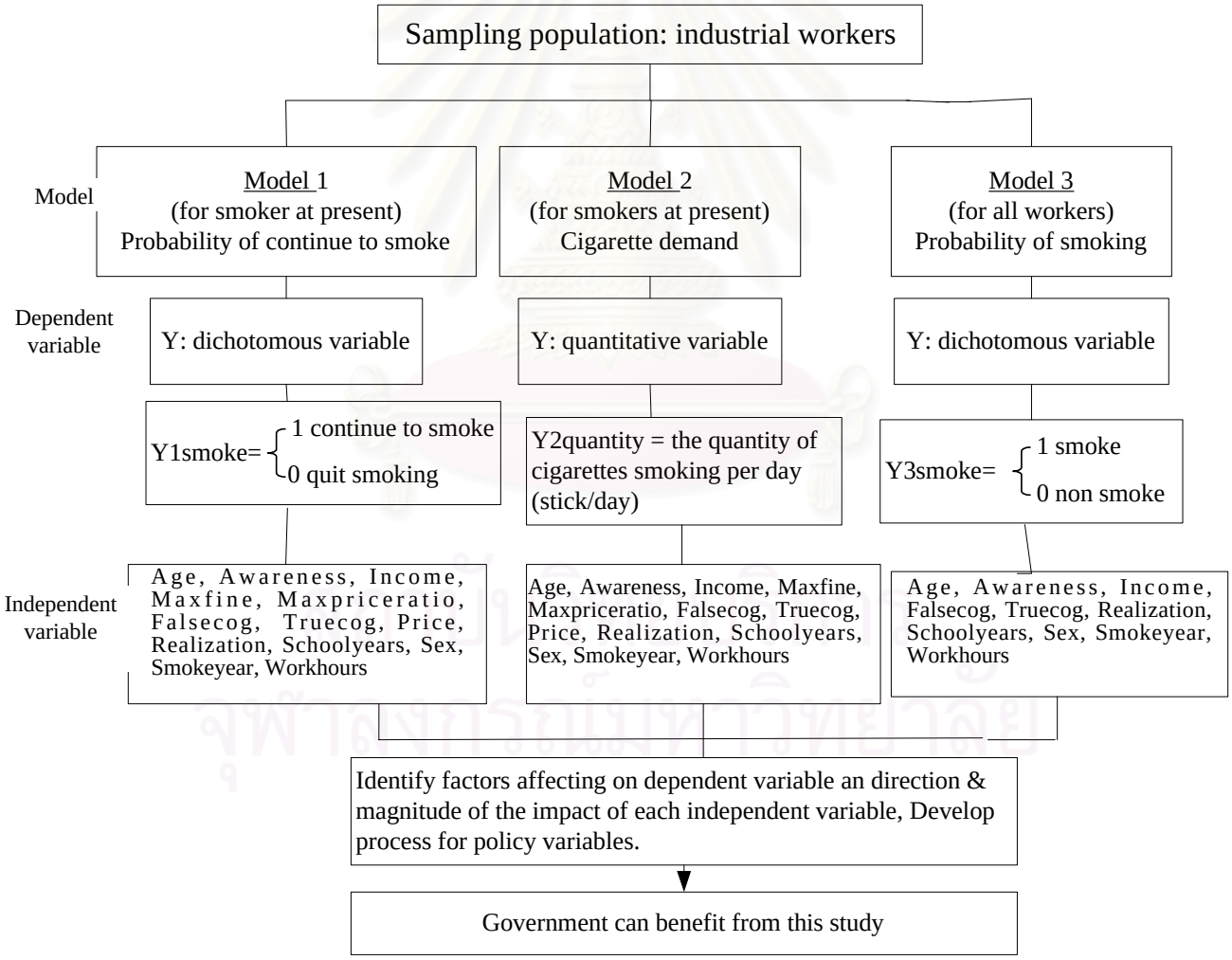
There are four main parts in the questionnaire, which has been designed carefully to extract useful information. Part One asks about the worker’s smoking behavior (e.g. if he/she smokes at present). Part Two asks for general

information about the interviewee. Part Three is comprised of questions about the reasons for starting (or not starting) to smoke and quitting. Finally, Part Four covers questions about cognition and attitude toward cigarettes and smoking. Details of the questionnaire are presented in Appendix I.

This study is going to analyze the answers from the questionnaire to study the factors that affect industrial workers' smoking behaviors. By identifying the factors affecting cigarette demand and by studying the magnitude and direction of the quantity of cigarettes smoked per day, the probability of smoking, the probability of continuing to smoke and other factors, useful and effective measures can be taken encourage people to not smoke.

3.2 Conceptual framework

Figure 3.1 Conceptual framework



3.3 Descriptive analysis

This section is for reviewing the characteristics of the workers. The following aspects were considered: age, degree of awareness about health hazards due to smoking, monthly income, the highest fine for smoking that they are willing to pay, the highest price that they are willing to pay for cigarettes, false cognition or false attitudes towards cigarettes, true cognition or true attitudes towards cigarettes, the price of cigarettes per pack, the realization of the enforcement of the Non-smokers Health Protection Act of 1992, education level, sex, the number of years smoking, the number of hours worked, the quantity of cigarettes smoked per day, the cause for quitting or continuing to smoke in the future, the reasons that lead to trying or not trying to smoke in the first place and the effects of warning messages on labels. All factors above must be analyzed carefully to obtain information in general that can explain their behavior in a percentage analysis table.

3.4 Logistic regression analysis

However, the application of the linear regression model when the dependent variable is qualitative, reflecting binary choices is more complex. In such a situation a logistic regression analysis can be used, looking at model 1 and model 3.

Model 1; for smoker at present use logistic regression analysis **(**binary logistic) to forecast the probability of continue to smoke.

$Y_{1continue}$ = f(age, awareness, income, maxfine, maxpriceratio, falsecog, truecog, price, realization, schoolyears, sex, smokeyear, workhours)

Dependent variable: $Y_{1continue}$ = the probability of continue to smoke (1=continue to smoke, 0=quit smoking)

Independent variable:

Age = age (years old)

Awareness = degree of awareness about health hazards due to smoking (point)

Income = monthly income (baht/month)

Maxfine = highest fine that willingness to pay (baht)

Maxpriceratio = the ratio of highest price of cigarette per pack that willingness to buy and price (baht)

Falsecog = false cognition or false attitude toward cigarettes (point)

Truecog = true cognition or true attitude toward cigarettes (point)

Price = price of cigarette per pack (baht/pack)

Realization = realization the enforcement of non smokers health protection act 1992(1=know, 0=don’t know)

Schoolyears = approximates of schooling years

Sex = sex (1=male, 0=female)

Smokeyear = the amount of smoking years (year)

Workhours = number of work hours per day (hours/day)

Logistic response function

P(continuetosmoke)=

$$\frac{e^{\beta 0+\beta 1 Age+\beta 2 Awareness+\beta 3 Income+\beta 4 Maxfine+\beta 5 Maxprice+\beta 6 Fal\sec og+\beta 7 Truecog+\beta 8 Actualpric e+\beta 9 \mathrm{Re}alization+\beta 10 Schoolyear s+\beta 11 Sex+\beta 12 Smokeyear+\beta 13 Workhours}}{1+e^{\beta 0+\beta 1 Age+\beta 2 Awareness+\beta 3 Income+\beta 4 Maxfine+\beta 5 Maxprice+\beta 6 Fal\sec og+\beta 7 Truecog+\beta 8 Actualpric e+\beta 9 \mathrm{Re}alization+\beta 10 Schoolyear s+\beta 11 Sex+\beta 12 Smokeyear+\beta 13 Workhours}}$$

$$\text{Logodds}=\log\left[\frac{P(continueto\ \ smoke)}{P(quitsmokin\ \ g)}\right]$$

$$=\beta 0+\beta 1 Age+\beta 2 Awareness+\beta 3 Income+\beta 4 Maxfine+\beta 5 Maxprice+\beta 6 Fal\sec og+\beta 7 Truecog+\beta 8 Actualpric e+\beta 9 \mathrm{Re}alization+\beta 10 Schoolyear s+\beta 11 Sex+\beta 12 Smokeyear+\beta 13 Workhours$$

Do loglstic regression **(**binary logistic) analysis by using econometric tool to find the log odds value

$$\beta 0+\beta 1 Age+\beta 2 Awareness+\beta 3 Income+\beta 4 Maxfine+\beta 5 Maxprice+\beta 6 Fal\sec og+\beta 7 Truecog+\beta 8 Actualpric e+\beta 9 \mathrm{Re}alization+\beta 10 Schoolyear s+\beta 11 Sex+\beta 12 Smokeyear+\beta 13 Workhours \rightarrow \log(odds) \rightarrow Z$$

$$\text{log odds} = \log\left[\frac{P(continueto\,smoke)}{P(quitsmokin\,g)}\right] = \beta_0 + \beta_1 X_1 + \ldots + \beta_i X_i$$

where i = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 X_i = Independent variable

for factor X_i and give others **X** as constant

if $\beta_i > 0 \rightarrow$ constant + $\beta i Xi > 0 \rightarrow$ ratio $> 0 \rightarrow$ probability of continue to smoke > probability of quit smoking

if $\beta_i < 0 \rightarrow$ constant + $\beta i Xi < 0 \rightarrow$ ratio $< 0 \rightarrow$ probability of continue to smoke < probability of quit smoking

if $\beta_i = 0 \rightarrow$ constant + $\beta i Xi = 0 \rightarrow$ ratio $= 0 \rightarrow$ independent variable does not affect the probability of continue to smoke

Model 3; for all workers use logistic regression analysis **(**binary logistic) to forecast the probability of smoking.

Y_{3smoke}= f(age, awareness, income, falsecog, truecog, realization, schoolyears, sex, workhours)

Dependent variable: Y_{3smoke}= the probability of smoking (1=smoke, 0=nonsmoker)

Independent variable :

Age = age (years old)

Awareness = degree of awareness about health hazards due to smoking (point)

Income = monthly income (baht/month)

Falsecog = false cognition or false attitude toward cigarettes (point)

Truecog = true cognition or true attitude toward cigarettes (point)
Realization = realization the enforcement of non smokers health protection act 1992 (1=know, 0=don't know)
Schoolyears = approximates of schooling years
Sex = sex (1=male, 0=female)
Smokeyear = the amount of smoking years (year)
Workhours = number of work hours per day (hours/day)
Logistic response function

$$P(smoke)= \frac{e^{\beta 0+\beta 1 Age+\beta 2 Awareness+\beta 3 Income+\beta 4 Falsecog+\beta 5 Truecog+\beta 6\,\mathrm{Re}alization+\beta 7 Schoolyears+\beta 8 Sex+\beta 9 Workhours}}{1+e^{\beta 0+\beta 1 Age+\beta 2 Awareness+\beta 3 Income+\beta 4 Falsecog+\beta 5 Truecog+\beta 6\,\mathrm{Re}alization+\beta 7 Schoolyears+\beta 8 Sex+\beta 9 Workhours}}$$

Logit response function

$$\text{logodds}= \log\left[\frac{P(smoke)}{P(nonsmoke)}\right] = \beta 0 + \beta 1 Age + \beta 2 Awareness + \beta 3 Income + \beta 4 Falecog + \beta 5 Truecog + \beta 6\,\mathrm{Re}alization + \beta 7 Schoolyears + \beta 8 Sex + \beta 9 Workhours$$

Do logistic regression **(**binary logistic) analysis by using econometric tool to find the log odds value

$$\beta 0 + \beta 1 Age + \beta 2 Awareness + \beta 3 Income + \beta 4 Falecog + \beta 5 Truecog + \beta 6\,\mathrm{Re}alization + \beta 7 Schoolyears + \beta 8 Sex + \beta 9 Workhours \rightarrow \log(\text{odds}) \rightarrow Z$$

$$\log \text{odds} = \log\left[\frac{P(smoke)}{P(nonsmoke)}\right] = \beta_0 + \beta_1 X_1 + \ldots + \beta_i X_i$$

where i = 0,1,2,3,4,5,6,7,8,9 X_i= Independent variable
for factor X_i and give others **X** as constant
if $\beta_i > 0 \rightarrow$ constant + $\beta i Xi > 0 \rightarrow$ ratio $> 0 \rightarrow$ probability of smoking > probability of nonsmoking
if $\beta_i < 0 \rightarrow$ constant + $\beta i Xi < 0 \rightarrow$ ratio $< 0 \rightarrow$ probability of smoking < probability of nonsmoking
if $\beta_i = 0 \rightarrow$ constant + $\beta i Xi = 0 \rightarrow$ ratio $= 0 \rightarrow$ independent variable does not affect the probability of smoking

3.5 Multiple regression analysis

Usually when a regression equation has three or more than three variables, we call it a multiple-regression model. The statistical formulas for estimating parameters, variance and testing the parameters are very similar, or in some cases identical, to the two variable regression model. The exact functional forms of quantitative relationships in econometric studies are rarely deduced theoretically; they are usually determined empirically. The simplest functional form is a linear equation. However, economic relationships cannot always be expressed in linear form. In some cases an exponential or logarithmic function best describes the curvature of the economic relationship.

Model 2; for smoker at present use OLS to find demand function of cigarette smoking behavior.

$Y_{2quantity}$= f(age, awareness, income, maxfine, maxpriceratio, falsecog, truecog, price, realization, schoolyears, sex, smokeyear, workhours)

Ordinary least square approach to multiple regression analysis to estimate the multiple regression function

$Y_{2quantity} = \beta_0 + \beta_1 Age + \beta_2 Awareness + \beta_3 Income + \beta_4 Maxfine + \beta_5 Maxpriceratio + \beta_6 Falsecog + \beta_7 Truecog + \beta_8 Price + \beta_9 Realization + \beta_{10} Schoolyears + \beta_{11} Sex + \beta_{12} Smokeyear + \beta_{13} Workhours$

where β_i = the partial regression coefficient

Dependent variable: $Y_{1quantity}$= the quantity of cigarette smoking per day (stick per day)

Independent variable :

Age = age (years old)

Awareness = degree of awareness about health hazards due to smoking (point)

Income = monthly income (baht/month)

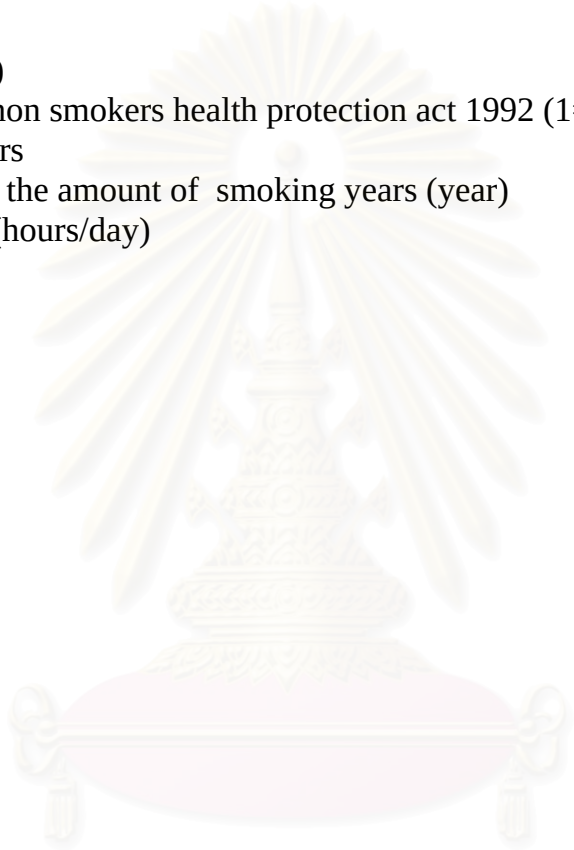
Maxfine = highest fine that willingness to pay (baht)

Maxpriceratio = the ratio of the highest price of cigarette per pack that willingness to buy and price (baht)

Falsecog = false cognition or false attitude toward cigarettes (point)

Truecog = true cognition or true attitude toward cigarettes (point)

Price = price of cigarette per pack (baht/pack)
Realization = realization the enforcement of non smokers health protection act 1992 (1= know, 0= don’t know)
Schoolyears = approximates of schooling years
Sex = sex (1= male,0= female), Smokeyear = the amount of smoking years (year)
Workhours = number of work hours per day (hours/day)



Multiple coefficient of determination: R^2, adjusted R^2: The result from analyzing the regression equation with the OLS method is R^2. The multiple coefficient of determination measures the goodness of fit of the regression equation; that is, it gives the proportion or percentage of the total variation in the dependent variable Y explained by the explanatory variable X:

$$R^2 = \left[\frac{SSR}{SST} \right] = 1 - \left[\frac{SSE}{SST} \right]$$
$$0 \leq R^2 \leq 1$$

when R^2 is close to one, $X_1, X_2, \ldots, X_k$ will be highly related to variable Y or the percent of $X_1, X_2, \ldots, X_k$ could describe how highly affected the variation of variable Y is. But when R^2 is close to 0, $X_1, X_2, \ldots, X_k$ will have little relation to variable Y or the percent of $X_1, X_2, \ldots, X_k$ could describe how little the affect of variation in variable Y. According to the fact that SSR will increase if an independent variable is added, then if we add more independent variables in the regression, R^2 will increase; although, increasing the independent variable X could be unrelated to Y. So R^2 needs to be adjusted anyway to be Adjusted R^2 in which:

$$\text{Adjusted } R^2 = 1 - \left[\frac{SSE \ /(n-k-1)}{SST \ /(n-1)} \right] = 1 + \left[\frac{(n-1)}{(n-k-1)} \right] (R^2 - 1)$$

where k = number of independent variable, n = sample size

Count R^2: Analyzing the regression equation by the binary logic model could not extract the value of R^2. However, the analysis could provide the result in the form of McFadden R^2 that also does not help. Therefore, it is more appropriate to analyze the regression equation by using Count R^2, where Count R^2 equals the number of correct predictions divided by the total number of observations.

The variations in the variable of the binary logic model could only be 0 or 1. Assuming that the estimated value for analyzing a regression equation is less than 0.5, the variable will be fixed to be 1 or otherwise to be 0. The number of correct predictions that could be extracted from the information collected from each worker could then replace it in the final equation. Suppose the probability ($P_i = 1 \div (1 + e^{-(\beta 0 + \beta i X i)})$ is less than 0.5 with a dependent variable equal to 1, or the worker does not choose a dependent variable equals 0, the information from him or her will be considered a correct prediction. However, if the probability is more than 0.5 and the worker does not choose a dependent

variable equal to 1, the information from him or her will not be considered a correct prediction.

Correlation coefficient: Correlation coefficient is used to show what the correlation is between two variables. Moreover, it also shows level of the correlation. The correlation coefficient from variable X and Y:

$$\rho = \left[\frac{COV \ (X, Y)}{\sigma x \, \sigma y} \right]$$

Assume that the correlation coefficient is varied between -1 and 1 ($-1 \leq \rho \leq 1$)

If $\rho = 1$, a correlation between two variables is an absolute positive linear relation

If $\rho = -1$, a correlation between two variables is an absolute negative linear relation

If $\rho = 0$, a correlation between two variables is not related in linear terms

When ρ is higher, correlation between the two variables is also higher and the +/- signs are used to describe its direction.

3.6 Hypothesis

a) Hypothesis of Model 1 for workers who being smoker at the time of interview.

$Y_{1continue}$ = f(age, awareness, income, maxfine, maxpriceratio, falsecog, truecog, price, realization, schoolyears, sex, smokeyear, workhours)

$Y_{1continue}$: the probability of continue to smoke, 1= continue to smoke, o= not continue to smoke

Age, awareness, maxfine, maxpriceratio, truecog, price, realization, schoolyears have negative effect on the probability of continue to smoke.

Income, falsecog, sex, smokeyear, workhours have positive effect on the probability of continue to smoke.

b) Hypothesis of model 2for workers who being smoker at the time of interview

$Y_{2quantity}$ = f(age, awareness, income, maxfine, maxpriceratio, falsecog, truecog, price, realization, schoolyears, sex, smokeyear, workhours)

$Y_{2quantity}$: the cigarette demand per day (stick per day)

Age, awareness, maxfine, maxpriceratio, truecog, price, realization, schoolyears have negative effect on the demand for cigarette.

Falsecog, sex, smokeyear, workhours have positive effect on the the demand for cigarette.

c) Hypothesis of model 3 for all workers

Y_{3smoke} = f(age, awareness, income, falsecog, truecog, realization, schoolyears, sex, workhours)

Y_{3smoke}: the probability of smoking; 1= smoke, 0 = non smoke

Age, awareness, truecog, realization, schoolyears have negative effect on the probability of smoking.

Income, falsecog, sex, smokeyear, workhours have positive effect on the probability of smoking.

CHAPTER 4

RESULTS OF STUDY

4.1 The character and smoking behavior of industrial workers

378 industrial workers were interviewed to acquire useful information for this research. In this chapter, to discussion the result after analyzing the 378 questionnaires. The questionnaire was focused on the causes of smoking behavior, the potential to start smoking, the quantity of cigarettes smoked per day, reasons for becoming a smoker and the reasons for choosing not to smoke or to quit. The examined factors included the individual's age, degree of awareness about the health hazards associated with smoking, monthly income, degree of willingness to pay fines for smoking, tolerance for price per pack of cigarettes, false cognition or attitudes toward cigarettes, true cognition or attitudes toward cigarettes, realization of the enforcement of the Non-smokers' Health Protection Act of 1992, average years of schooling, sex, the number years smoking, and the number of work hours per day. The results have been reviewed in detail below.

According to the survey, the average smoking prevalence rate for all workers is 32.80% (see Table 4.1). Thus, industrial workers who are employed in the plant and machinery industries have a higher tendency to smoke than those who work in other occupations (see Table 1.4). The smoking prevalence rate is also much higher among males than females, with 47.58% of men smoking as compare with 4.62% of women (see Table 4.1). So, nearly one out of every two men is a smoker.

Table 4.1: Number of smokers and smoking prevalence of workers by sex.

Sex	Total		
	Sample	Number of smokers	Smoking prevalence
Female	130	6	4.62%
Male	248	118	47.58%
Total	378	124	32.80%

Source: Survey results.

Table 4.2 demonstrates that the smoking prevalence decreases (though only slightly) with age. By interviewing industrial workers at Bang Khun Thian district who are between 18 and 53 years of age, the highest smoking prevalence rate is among those who are in the 18-29 year old group (about

34%), followed by the 30-41 year old group (about 33%) and the group of 42-53 year olds had the lowest rate which was around 30%.

Table 4.2: Number of smokers and smoking prevalence of workers 18 years of age and over by age group.

Age group (years old)	Total		
	Sample	Number of smokers	Smoking prevalence
18-29	153	52	33.99%
30-41	138	46	33.33%
42-53	87	26	29.89%
Total	378	124	32.80%

Source: Survey results.

The education of industrial workers tends to be quite low. Most of the workers in the survey reported leaving school before completing their secondary level education. The majority (52.65 percent) of the workers only finished elementary school. The average education level of the workers is secondary school grade 1-2, meaning an average of 8.59 years of completed schooling. Also, the survey found that workers who finished grade 3 of secondary school had the highest prevalence rate of being smokers at about 40%, followed by those who completed up to grade 6 of elementary school at about 33%. The workers who finished university have the lowest smoking prevalence rate (about 22%), showing that higher education is an important factor in reducing the smoking prevalence rate.

Table 4.3: Number and percentage of workers by education level.
(Schoolyears = approximates of schooling years (Isra, 1997: 159))

Schoolyears	Education level	Total		
		sample	Number of smokers	Smoking prevalence
5	Elementary grade 4	41	13	31.71%
7	Elementary grade 6	199	65	32.66%
10	Secondary grade 3	68	27	39.71%
13	Secondary grade 6	52	15	28.85%

Source: Survey results.

Table 4.3: Number and percentage of workers by education level. (Continued)
(Schoolyears = approximates of schooling years (Isra, 1997: 159))

Schoolyears	Education level	Total		
		sample	Number of smokers	Smoking prevalence
14-17	University year 1-Bachelor degree	18	4	22.22%
Total		378	124	32.80%

Source: Survey results.

Another factor that affects the smoking prevalence rate is the number of hours worked per day. The results in Table 4.4 show that longer work hours leads to an increase in the smoking prevalence rate which peaks at 43.33% for a 10-11.5 hour working day before dropping slightly. Table 4.4 also shows that the smoking prevalence rate of the workers who work 8-9.5 hours per day, which is a typical work day, is the lowest. If these workers increased their hours by 0.5 to 1.5 hours, the smoking prevalence rate would climb dramatically. According to this, it can be concluded that workers are more likely to smoke when they feel more pressure from increased working hours. Interestingly, though, as they are given more responsibility to handle when working more than 12 hours, it is possible that the smoking prevalence rate is lower since the workers actually end up with less time left in the day for smoking.

Table 4.4: Number of smokers and smoking prevalence of workers
by number of work hours per day.

Workhours (hours/day)	Total		
	Sample	Number of smokers	Smoking prevalence
8-9.5	215	61	28.37%
10-11.5	60	26	43.33%
12-13.5	93	34	36.56%
14-15.5	10	3	30.00%
Total	378	124	32.80%

Source: Survey results.

According to Table 4.5, most workers have an income of less than 5,000 Baht per month and only a small portion of them earned more than 10,000 Baht per month. The average monthly income of the workers surveyed was 7,749.5 Baht per month, of which the highest income was 35,000 Baht per month and the lowest was 2,000 Baht per month. The smoking prevalence rate decreases with monthly income which means that smokers with more income are less likely to smoke. It seems that this group has a higher degree of awareness of the health hazards associated with smoking and are more concerned with their health. Also, it may be inferred that higher level workers have more duties to perform, and therefore, they have less time to smoke.

Table 4.5: Number of smokers and smoking prevalence of workers by monthly income.

Income (baht/month)	Total		
	Sample	Number of smokers	Smoking prevalence
<5,000	162	60	37.04%
5,001-10,000	156	51	32.69%
10,001-15,000	35	8	22.86%
>1,5001	25	5	20.00%
Total	378	124	32.80%

Source: Survey results.

Every factory is required by the government to provide non-smoking areas. Some factories have prohibited workers from smoking during work hours or provided a particular area specifically for smokers. Violators of these regulations may be punished by suspension from work or by a fine. However, even with non-smoking areas in factories, the amount of smokers is still significant at 32.80% (see Table 4.6), which means that the restrictions on areas to smoke are not an important factor in discouraging smoking.

Table 4.6: Number of smokers and smoking prevalence of workers by having non smoking area in work place.

Non smoking area	Total		
	Population	Number of smokers	Smoking prevalence
Not have	0	0	-
Have	378	124	32.80%
Total	378	124	32.80%

Source: Survey results.

Table 4.7 shows that most workers, or 80.95% of the 378 workers surveyed, have realized that the Non-smokers' Health Protection Act of 1992 is being enforced. Moreover, the smoking prevalence rate among those who knew about the enforcement of the Act is 31.37%, as compared with 38.89%, which is the rate of those who did not know about the enforcement. Thus, these results demonstrate that acknowledgement of Act regulation and fine may have some effect in decreasing the smoking prevalence rate.

Table 4.7: Number of smokers and smoking prevalence of workers by realization the enforcement of non smokers' health protection act 1992.

Realization	Total		
	Sample	Number of smokers	Smoking prevalence
Don't know (0)	72	28	38.89%
Know (1)	306	96	31.37%
Total	378	124	32.80%

Source: Survey results.

Table 4.8 shows that the majority, or 63.71%, of the total smokers have been smoking for between one and ten years. The longest time recorded for a smoker in this group was 37 years. According to the information, the smokers have smoked an average of 10.67 years. Since the degree of addiction can be indicated by the number of years they smoke, workers in this survey are quite addicted to cigarettes.

Table 4.8: Number and percentage of workers by the amount of smoking years.

Smokeyear (year)	Number of workers	Percentage of workers
1-10	79	63.71
11-20	36	29.04
21-30	7	5.65
31-40	2	1.62
Total	124	100

Source: Survey results.

A pack of cigarettes at this time costs 33.16 Baht on average. Most of the workers surveyed commented that they choose to smoke cigarettes made in Thailand because these cigarettes are cheaper.

Table 4.9: Number and percentage of workers by price of cigarette per pack.

Price of cigarette (baht per pack)	Number of workers	Percentage of workers
25	26	20.97
28	1	0.81
30	5	4.03
35	78	62.90
38	3	2.42
40	11	8.87
Total	124	100.00

Source: Survey results.

Most of the respondents (about 89%) commented that the highest price they are willing to pay for a pack of cigarettes is 60 Baht (see Table 4.10 (a)). If the price is higher than this, it's possible that they would not make the purchase. According to the survey, if the price was raised as high as 300 Baht per pack, only one of the workers would be willing to purchase the cigarettes. Also, 51.8 Baht per pack is average amount mentioned for the highest price that they are willing to accept. Therefore, it may be concluded that a 56.21% price increase over the average price of a pack of cigarettes today (33.16 Baht) would result in a decrease in the percentage of smokers.

Table 4.10 (a): Number and percentage of workers by highest price of cigarette per pack that willingness to buy.

Maxprice (baht)	Number of workers	Percentage of workers
25-60	110	88.73
100	11	8.87
150	2	1.61
300	1	0.81
Total	124	100

Source: Survey results.

The results indicate that the maximum price ratio of smokers is 1.56 on average. It should be noted that if cigarette prices increase by 5.6%, many smokers would still be willing to buy cigarettes. In other words, increasing cigarette prices by 5.6% would likely have no impact on those smokers who have a maximum price ratio of more than 1.56. But, for the group of smokers who have a maximum price ratio of less than 1.56, which is about 69% of the total number of smokers, increasing cigarette prices by 5.6% could have effect on curbing their smoking.

Table 4.10 (b): Number and percentage of workers, sorted by highest price ratio (relative price) willing to pay per pack of cigarettes.

Maxpriceratio	Number of smokers	Percentage of smokers
1.00-1.49	85	68.55
1.50-1.99	19	15.32
2.00-2.49	6	4.84
2.50-2.99	10	8.06
≥3.00	4	3.23
Total	124	100

Source: survey results.
Note: Maxpriceratio = Maxprice ÷ Actualprice.

The Non-smokers' Health Protection Act of 1992 has been enforced in Thailand as a measure protect non-smokers and discourage those who do smoke. The Act states that anyone who smokes in a non-smoking area shall be fined 2,000 Baht. Table 4.11 shows that if the fine is less than 2,000 Baht, most workers would be so willing to pay it for violating the regulation. Interestingly, some of the workers surveyed were willing to pay as much as 20,000 Baht in fines, though most workers would not violate the regulation if the fine is greater than 2321.69 Baht (average maximum fine). Moreover, the survey found that 62.92% of the total workers abide by the Act willingly, so the Act seems like practical and suitable enforcement measure for industrial workers.

Table 4.11: Number and percentage of workers by highest fine that willingness to pay.

Maxfine (Baht)	Number of workers	Percentage of workers
0-2000	78	62.91
2001-4000	33	26.63
5000	6	4.84
7000	2	1.61
10000	4	3.23
20000	1	0.81
Total	124	100

Source: Survey results.

According to Table 4.12, within one day, most workers smoke ten cigarettes on average, with some smoking as many as 30 and others smoking only one cigarette. In the case of 30 cigarettes per day, this is equivalent to about 1.5 packs per day which costs approximately 40 Baht. When compared with the minimum wage rate of 150 Baht per day, they still have enough purchasing power for at least one pack. Thus, the percentage of smokers is likely to remain unchanged or increase as a result of the majority of workers being able to afford to the price of the cigarettes in line with the quantity of cigarettes that they smoke per day.

Table 4.12: Number and percentage of workers by the quantity cigarette smoking per day.

Y3quantity (Stick/day)	Number of workers	Percentage of workers
1-5	50	40.32
6-10	38	30.65
11-15	11	8.88
20	17	13.71
25	4	3.23
30	4	3.23
Total	124	100.00

Source: Survey results.

According to Table 4.13, 62.9% of total workers who smoke plan to quit smoking, so the expected number of smokers in the future is likely to decrease.

Table 4.13: Number and percentage of workers by the decision of quitting of current smokers.

$Y_{3continue}$	Number of workers	Percentage of workers
Quit smoking	78	62.90
Continue to smoke	46	37.10
Total	124	100.00

Source: Survey results.

Table 4.14 shows that the group of non-smokers are firm in their commitment to not begin smoking in the future. This is a good sign. Moreover, it proves that non-smokers are not a factor affecting the smoking prevalence rate.

Table 4.14: Number and percentage of workers by the decision of trying to smoke of non smokers

Try to smoke	Number of workers	Percentage of workers
Not try	254	100
Try	0	0
Total	254	100

Source: Survey results.

Table 4.15 shows that the most important reason in terms of mean score (1.86) for workers to give up smoking is the awareness of smoking being a health hazard. Besides the choices that were given in the questionnaire, many people wrote in their own reasons for deciding to quit such as because it makes them smell bad, people around them feel annoyed by the smoke, their kids asked them not to smoke, they do not have enough money, they need the money to repay debts and the government still supports tobacco factories. Therefore, people may have many different reasons for choosing to quit based on their personal motivations and lifestyles. However, in terms of the health effect of smoking, it seems clear that if smokers have more knowledge about the adverse effects of cigarettes, perhaps they will be more inclined to eventually quit smoking.

Table 4.15: Number of smokers and mean score by the reason of quitting smoking of current smokers.

Reason		Sample	number of smokers		Mean score
			Yes	No	
15.1	My partner and family asked me to quit.	78	61	17	1.78
15.2	It is bad for my health.	78	67	11	1.86
15.3	It makes me less fit	78	64	14	1.82
15.4	I am sick, so I quit as my doctor's advice.	78	42	36	1.54
15.5	It is bad for the health of people near me	78	49	29	1.63
15.6	I need to save some money.	78	56	22	1.72
15.7	I believe that people disapprove of smoking	78	33	45	1.42
15.8	I take a non smoking campaign seriously	78	47	31	1.60
15.9	It's hard to smoke since smoking in public is prohibited.	78	40	38	1.51
15.10	It's hard to smoke because of limited smoking area in workplace.	78	43	35	1.55

Source: Survey results.

Table 4.15: Number of smokers and mean score by the reason of quitting smoking of current smokers. (Continued)

Reason		Sample	number of smokers		Mean score
			Yes	No	
15.11	Please write your other reasons (if any)	It's my intention to quit. It makes me stink. People around me feel annoyed with smoke. I'm capable to reduce the quantities of cigarettes. My kids ask me not to. For my health's sake. I've decide to quit for a while. I want to save money to repay my debts. I don't want to be shunned by other and afraid of health hazard. Forsake of someone whom I care. The government has tobacco factory. I did felt like to quit. I can't continue smoking anymore. It made me stink.			

Source: Survey results.

The survey shows that the most important reason, with a mean score of 1.91, why some smokers will not quit smoking is because it helps them relax and ease distress. Other major reasons are because they feel too addicted to quit, not smoking causes them feel frustrated, they can never resist the craving for cigarette and smoking makes them feel less lonely. The least chosen reason was because they doubted that smoking was bad for their health. Some additional reasons that were written in included that they see smoking as a part of their daily routine, they have already tried to smoke less but failed and they are afraid of experiencing the side-effects associated with cessation of smoking. It seems then that the majority of smokers are aware of the adverse health affects of smoking, but still choose to continue the habit because of psychologically driven reasons.

Table 4.16: Number of smokers and mean score by the reason of continue to smoke of current smokers.

Reason		Sample	number of smokers		Mean score
			Yes	No	
16.1	I can't resist the craving for a cigarette	46	36	10	1.78
16.2	I doubt smoking is bad for health.	46	11	35	1.24
16.3	People around me smoke.	46	30	16	1.65

Source: Survey results.

Table 4.16: Number of workers and mean score by the reason of continue to smoke of current smokers. (Continued)

Reason		Sample	number of smokers		Mean score
			Yes	No	
16.4	It helps me relax and ease distress	46	42	4	1.91
16.5	I would be bored if I quitted smoking.	46	34	12	1.74
16.6	It helps me think clearer and smarter.	46	21	25	1.46
16.7	I might be incapable to quit.	46	32	14	1.70
16.8	I think I am too addicted to cigarettes	46	38	8	1.83
16.9	Please write your other reasons (if any)	It's kind of my daily routine and I've already tried to smoke less. I tried to quit once but it's too bad. I'm afraid of side-effect of smoking cessation.			

Source: Survey results.

The survey shows that all workers who are non-smokers don't have any intention of starting to smoke in the future (see Table 4.14). The main reason for this is because they have realized that smoking causes heart disease and lung cancer (a mean score of 1.95). The other concern of importance for not starting was the realization that smoking causes premature deaths. In addition to this, respondents wrote in other reasons including being afraid of becoming addicted, being afraid of social disapproved, maintaining good hygiene and being afraid of cancer. So, the survey supports that if non-smokers have the correct knowledge about smoking and understand the dangers associated with this habit, they will not likely choose to start smoking in the future.

Table 4.17: Number of workers and mean score by the reason of not trying to smoke of non smokers.

Reason		Sample	number of workers		Mean score
			Yes	No	
17.1	Cigarette smoking cause premature deaths	254	238	16	1.94
17.2	My partner and family don't approve.	254	94	160	1.37

Source: Survey results.

Table 4.17: Number of workers and mean score by the reason of not trying to smoke of non smokers. (Continued)

Reason		Sample	number of workers		Mean score
			Yes	No	
17.3	I've realized that smoking cause a heart disease and lung cancer.	254	241	13	1.95
17.4	Please write your other reasons (if any)	Afraid of addictive, afraid of being disapproved, hate smokers, its smoke is smelt, it makes teeth yellow, it makes lips dark, it make me die young, afraid of cancer.			

Source: Survey results.

Table 4.18 demonstrates the level importance of the reasons affecting smokers' behavior. With a mean score of 3.09, the factor which received the highest amount of "very important" responses was related to being fined for violating the regulations of the factory. This was followed closely by respondents informing us that a limited smoking area and their families asking them to quit as "very important" reasons which affected their smoking behavior. Factories are required to create non-smoking areas to prevent fires. If each factory were to take this responsibility seriously and enforce this regulation, the number of smokers would potentially decrease since most workers spend the majority of their day (8.00–23.00) at the factory. Moreover, if workers have the opportunity to participate in activities such as games or sports as well as get 15 minutes more break time in the morning and afternoon instead of having only a lunch-time break, there is the potential to help workers relax without them feeling the need to smoke. Despite of regulations making some areas non-smoking, it should be noted that some workers still smoke in these places (e.g. toilets and canteens). For measures like the prohibition of smoking during working hours, these factors do not affect smokers' behavior very much because the workers still have the opportunity to smoke during their lunch break. The survey also showed that all of the reasons mentioned above do not affect the behavior of non-smoker workers.

Table 4.18: Number of smokers and mean score by an effective reason that affects smokers' behavior.

Factors		Sample	Number of smokers				Mean score
			Not important	Hardly important	Quite important	Very important	
19.1	Be forbidden to smoke during work	124	21	15	38	50	2.94

Source: Survey results.

Table 4.18: Number of smokers and mean score by an effective reason that affects smokers' behavior. (Continued1)

Factors		Sample	Number of smokers				Means core
			Not important	Hardly important	Quite important	Very important	
19.2	People around me ask me not to	124	12	12	48	52	3.13
19.3	It is bad for my health	124	16	17	43	48	2.99
19.4	It is bad for my family's health	124	16	17	43	48	2.99
19.5	Limited smoking area provided in workplace	124	20	27	25	52	2.88
19.6	Limited smoking area provided in public	124	19	30	31	44	2.81
19.7	People disapprove of smoking	124	19	26	44	35	2.77
19.8	Quit smoking campaign shown in TV and radio	124	16	30	43	35	2.78
19.9	Quit smoking campaign shown in printed media	124	16	30	43	35	2.78
19.10	Sticker or sign of non smoke area	124	15	29	41	39	2.84

Source: Survey results.

Table 4.18: Number of smokers and mean score by an effective reason that affects smokers' behavior. (Continued 2)

Factors		Sample	Smokers				Means core
			Not important	Hardly important	Quite important	Very important	
19.11	Censored smoking scene in TV	124	24	25	33	42	2.75
19.12	Be fined due to violating factory regulation	124	13	22	30	59	3.09
19.13	Decreasing work hours	124	24	16	41	43	2.83
19.14	Religious belief	124	34	27	43	20	2.40

Source: Survey results.

According to Table 4.19, the most effective warning message, mean score about 3.36, involves concern over children's health, which is followed by lung cancer risks, bad breath, risk of emphysema, serious health hazards and causing premature ageing, respectively. The results suggest that smokers are more likely to be concerned about their children than themselves. Of course, there are also concerns about lung cancer creating a fortune in medical costs. Industrial workers that become ill typically lose their jobs because they lose their physical strength and become burdens to their families. According to this, if smokers receive accurate information about how bad smoking is for their health and how dangerous smoking is to children and pregnant women, they will be more likely to give up smoking.

The survey also suggests that warning message do not affect most non-smokers because they never buy nor read these warnings. However, some are familiar with them from television, magazine and radio, but they aren't critical to their decisions not to smoke.

Table 4.19: Number of smokers and mean score by how warning on cigarette pack affect smokers' smoking habit.

Warning		Sample	Number of smokers				Mean score
			Not important	Hardly important	Quite important	Very important	
20.1	Premature death	124	21	29	37	37	2.73

Source: Survey results.

Table 4.19: Number of smokers and mean score by how warning on cigarette pack affect smokers' smoking habit. (Continued)

Warning		Sample	Number of smokers				Mean score
			Not important	Hardly important	Quite important	Very important	
20.2	Bad for children health	124	12	11	21	80	3.36
20.3	Breath smell	124	10	27	20	67	3.16
20.4	Risk for emphysema	124	12	15	33	64	3.20
20.5	Serious health hazard	124	14	20	34	56	3.06
20.6	Risk for lung cancer	124	15	9	24	76	3.30

Source: Survey results.

According to the study, the scores of workers' true attitudes toward cigarettes are 25.82 on average and 60.58% of the total workers have a higher score than the average. This suggests that most smokers are satisfied with the results. Based on the smoking prevalence rate (Table 4.20), the study shows that if workers have a higher true cognition score, then the smoking prevalence rate is going to decrease accordingly.

Table 4.20: Number of smokers and smoking prevalence of workers by true cognition or attitude toward cigarettes.

Truecog's score (point)	Total		
	Sample	Number of smokers	Smoking prevalence
11-15	1	1	100.00%
16-20	14	7	50.00%
21-25	134	59	44.03%
26-30	229	57	24.89%
31-35	0	0	-
Total	378	124	32.80%

Source: Survey results.

The survey shows that the average score of false attitudes of workers toward cigarettes is 11.29 points or 45.16% of total scores, which satisfies the results. Moreover, according to Table 4.21, the results show that the increasing prevalence of smoking is closely related to the score of the false attitudes toward cigarettes. Thus, if the workers have the wrong attitudes toward smoking, the smoking prevalence rate of workers will increase.

Table 4.21: Number of smokers and smoking prevalence of workers by false cognition or attitude toward cigarettes.

Falsecog's score (point)	Total		
	Sample	Number of smokers	Smoking prevalence
≤5	9	1	11.11%
6-10	160	38	23.75%
11-15	170	69	40.59%
16-20	30	12	40.00%
21-25	9	4	44.44%
Total	378	124	32.80%

Source: Survey results.

The study shows that the degree of awareness about health hazards due to smoking is 3.34 points on average, about 66.8% of the total score. According to Table 4.22, the study finds that the higher score on awareness of disease workers have, the less likely they are to smoke. So, when people realize the dangers and disadvantages of smoking, they are more likely to quit smoking, suggesting that increasing the degree of awareness will eventually lead to reductions in the smoking prevalence rate.

Table 4.22: Number of smokers and smoking prevalence of workers by degree of awareness of diseases.

Awareness's score (point)	Total		
	Sample	Number of smokers	Smoking prevalence
0	3	2	66.67%
1	16	8	50.00%
2	62	22	35.48%
3	93	32	34.41%
4	175	54	30.86%
5	29	6	20.69%
Total	378	124	32.80%

Source: Survey results.

As a result of descriptive analysis, the basic analysis of factors that affect smoking behavior, the probability of quitting smoking and workers' cigarette demand, the study reveals some important aspects. However, to obtain more accurate and helpful information regarding industrial workers' smoking behaviors, quantitative and qualitative analyses are required. To determine the significant factors relevant to solving smoking problems, it is critical to evaluate the results in Section 4.1 along with other relevant literature to help extract the factors, which will be examined by logistic regression analysis (Models 1 and 3) and multiple regression analysis (Model 2) and described in detail below.

4.2The factors affecting the probability of continue to smoke (model 1)

One of many goals in this research is to analyze the factors affecting probability of continue to smoke of smoker workers. Then policy-makers can create some effective measures to stop smoking of workers. All these factors are analyzed with the binary logit model. The result is showed in table 4.23.

The study demonstrates that factors which have negatively effected the probability of continue to smoke are the sex of industrial workers, their degree of awareness about health hazards relate to cigarettes smoking, schoolyears, age, their monthly income, their true cognition or attitude toward cigarette smoking, cigarette price and their realization about the enforcement of non smokers health protection act 1992. These factors are present below.

Sex: The factor affecting probability of continue to smoke is sex. The study shows that male smokers have much higher probability to quit smoking than females. There could be many researches as follow: Ohio state university conducted research on Hypnosis found that its method of smoking cessation is helpful to men more than women. The study revealed that around 30% of men who used this treatment could quit smoking successfully, as compared with around 23% of women. Moreover, the study showed that it's more difficult for women to giving up smoking habit, because nicotine replacement therapy was not as effective for women as it was for men. Moreover, because of worrying about their weight gain after quit smoking, they seem reluctant to give up.
Also, Texas A&M university's research supported this conclusion too. The study showed that in comparison with men, women are more craving-reactive to smoking, they enjoy the olfactory taste and hand to mouth sensations associated with smoking. And smoking could improve their social interactions, ease their stress and prevent gaining an additional weight.

Awareness: Another factor affecting smoking behaviors in the future is degree of diseases awareness. The study shows that if more informing about bad effect of cigarette smoking could lead smoker workers to increase their probability of quitting smoking in the future.

Schoolyears: Another significant factor which is education level (schoolyear), the result shows that smoker workers who have a high education are likely to quit smoking more.

Income: Besides the workers' monthly income is not significant factor. Still this factor must be discussed. The result shows that the highly-paid workers have more probability of quitting smoking than the lowly-paid workers. The study also reveals that a change in income hardly affects the probability of quitting smoking. Nevertheless the income is important anyway. Based on one part of the questionnaires which asked for their opinions about smoking behaviors, it finds out that the highly-paid workers have more probability to quit smoking due to awareness about their health.

Price: Considering the price of cigarettes, the result of this study indicates that raising price hardly affects probability of quit smoking of smokers, although it will reduce demand for smoking. Heavy-smokers who have been smoking for a long time are so addicted to nicotine that quitting is too hard. So this factor has negative impact the probability of continue to smoke.

On the other hand, the amount of smoking years, the highest fine that workers are willing to pay as well as the maximum price ratio, their false cognition or attitude toward cigarette smoking, the amount of smoking years and the number of work hours per day are factors that have positive impact on the probability of continue to smoke. Base on the significant factors, the result shows that most of all factors which have positive impact on the probability of continue to smoke are not significant except for maximum fine and smoking years.

Smokeyears: The significant factor affecting slightly probability of continue to smoke is their duration of smoking (year), because it affects a level of addiction directly. Therefore, the longer workers smoke, the less probability of quitting smoking they have. Since nicotine found in tobacco is an addict drug, it causes many bad effects, like craving for more nicotine. And quitting can be too hard for the heavy-smokers.

Maxfine: This factor is significant. Results show that raising the fine for violating the non-smokers' health protection act 1992 will not increase the probability of quitting smoking. It should be noted that increasing the hightest fine that smokers are willing to pay leads to an increase in the probability of continue to smoke. The reason is because of their nicotine-craved. Smokers are so addicted to nicotine that they are willing to pay the fine for violating the act. Another reason why the non-smoking control measure does not success is because the act doesn't cover the entire factory compound. Despite of prohibiting smoking in the building, the smoker workers are still capable of smoke at other places around the factory which smoking are not permitted.

According to interviewing, a lot of smoker workers like to smoke in the toilets instead .As a result, the fine hardly affects to them

Analyzing collected information of 124 smoker workers, this study predicts their probability of quitting smoking or not in the future correctly about 66% which means 82 predictions whether they will quit smoking or not are correct. Thus this study result has quite high percentage of accurate and correct.

Table 4.23: The result of analyzing the factors affecting probability of continue to smoke with the binary logit model.

Variable[1]	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.9816	3.2235	-0.6147	0.5387
Age	-0.0151	0.0361	-0.4182	0.6758
Awareness	-0.2756	0.2302	-1.1971	0.2312
Income	-0.0001	0.0001	-1.7064	0.3312
Maxfine	0.0008	0.0007	1.1317	0.2278
Maxpriceratio	0.0554	0.2711	0.9421	0.3461
Falsecog	0.0140	0.0689	0.2040	0.8383
Truecog	-0.0022	0.0728	-0.0309	0.9753
Price	-0.0355	0.0504	-0.7053	0.4806
Realization	-0.0731	0.5533	-0.1321	0.8949
Schoolyears**	-0.1329	0.0921	-1.4437	0.1488
Sex	-0.2430	0.7266	-0.8892	0.2201
Smokeyear*	0.0761	0.0354	2.1492	0.0316
Workhours	0.0823	0.1428	0.5767	0.5641

Source: author's estimation.
[1]Abbreviations, field name, possible code and notation in appendix III.
Note: dependent variable: probability of continue to smoke. (continue to smoke = 1, quit smoking = 0)
*Significant level at 0.05.
** Significant level at 0.10.

4.3 The factors affecting cigarette demand (model 2)

The goal is to find out significant factors which affect cigarette demand of industrial smoker workers so that the government can create some effective measures to discourage smoking. Result's shown in table 4.24 proves how much each of the factors affects cigarette demand.

Based on the multiple regression analysis, the change in the cigarette demand is the result of many factors. In this study, the factors which have negative impacted the cigarette demand of workers such as the age of industrial workers, , their degree of awareness about health hazards relate to cigarettes smoking, their monthly income, their true cognition or attitude toward cigarette smoking, price of a pack of cigarettes and their realization about the enforcement of non smokers health protection act 1992 and their schoolyears.

Otherwise, the factors which have positive impact on the cigarette demand of workers including the highest fine that workers are willing to pay as well as the highest price ratio of cigarettes, their false cognition or attitude toward cigarette smoking, their sex, the amount of smoking years and the number of work hours per day.

As a result, 60.94% of the increase or decrease of cigarette demand depends on these above factors, while the rest, 39.06%, is up to the others which are not included in this study.

According to significant factors, the most important factor which strongly affect the cigarette demand is awareness about health hazards relate to cigarettes smoking, follow by realization, workhours, smoking year, age and maxpriceratio respectively.

Awareness: The decreasing of cigarette demand depends on the increasing of the workers' degree of awareness about health hazards relate to cigarettes smoking. It implies that smokers who have better knowledge about health hazards owing to smoking have a higher possibility to curb their smoking amount. Besides, being more awareness about cigarette smoking' s bad effect to themselves and those who are around means the workers obtain more knowledge. As the degree of awareness of disease is getting rise, the cigarette demand is going to decline consequently. It implies that a 1% raise of the degree of awareness of disease induces a 2.4% decrease of demand for cigarettes. Therefore, informing about health hazard is another interesting way that might raise their degree of awareness which eventually lead to reducing the quantity of cigarette smoking per day.

Realization: Also, this study indicates that realization the enforcement of non smokers' health protection act 1992 is another factor strongly affects to the change in the demand for cigarettes. But, this factor has less negative effect

on the cigarette demand than awareness about health hazards factor. If the smoker workers realize and understand why they need to abide by the regulation, the act and other important cigarette-related direction, the cigarette demand will absolutely decrease. It should be noted that a 1% raise of the degree of realization the act leads to a 1.6% decrease of cigarette demand of industrial workers. However, since the act has not implemented directly in factory, this factor might be quite important.

Workhours: The number of work hours per day is another significant factor for this study. When the number of work hours increases, the workers are likely to smoke more because they feel more stressed. This result indicates that a 1% increase of the numbers of work hours per day leads to a 0.5% increase of demand for cigarettes.

Smokeyear: The smoking year factor has positive impact on the demand for cigarettes because every 1% rise of the amount of smoking years leads to increasing the quantity of cigarette smoking per day by 0.4%. It should be noted that the longer smokers smoke, the more demand for cigarettes they have. Moreover, it's widely accepted that duration of smoking can indicate the degree of cigarette addiction.

Age: The analysis result implies that when smokers are getting older, they are likely to smoke less. Base on the coefficient, it implies that a 1% raise of age of smoker workers leads to a 0.1% decrease of cigarette demand. Though those who have been smoking for a longer time are likely to be more addicted and the elders have been smoking longer than young smokers, surprisingly the study shows that the elders tend to smoke less. They are likely to reduce their smoking because they are more aware of health hazardous. Because of more responsibility to work and family, they need to be healthy. Moreover, as becoming weaker due to aging, they've got worse effect than usual. So they really realize that they should smoke less for themselves and their families.

Maxpriceratio: Another significant factor slightly affects the cigarette demand is the maximum price ratio that workers are willing to buy for a pack of cigarettes. The study shows that price mechanism does not quite support discouraging the heavy smokers to reduce their amount of smoking per day. As a result of nicotine, when they are addicted, it's hard to reduce the number of cigarettes smoking per day or even impossible. So heavy smokers are willing to buy in spite of how much the cigarette is raised. As long as the price of cigarette is less than their maximum price ratio, they will continue buying it. Consequently, the cigarette demand rises according to the increase in the maximum price ratio that smokers are willing to buy for cigarettes compare with current price. However, the highest price ratio that occasional and regularly smokers is quite less than the heavy-smokers' ratio. According to

this, price mechanism affects the group of smokers who are not too much addicted.

In addition to this analysis, the change in the demand for cigarettes of smoker workers is the result of many insignificant factors. Nevertheless these non-significant factors may be quite important anyway.

Price: By considering the insignificant factors that have negative affect the demand for cigarettes, it should be indicated that raising the price of cigarette affect slightly to the quantity of cigarette smoking. Nevertheless raising price of cigarette is useful anyway. It should be noted that this study supports the demand theory. Therefore it can be deduced that increasing price of cigarettes leads to curb smoker workers' amount of smoking per day. It means that every 1% rise of price can decrease cigarette demand by 0.12%. The study also shows that in case the price is over smokers' capability, they are likely to smoke less. However, as tobacco is addictive product, the heavy smokers keep buying them as usual whatever anything happen. Moreover, the study show that workers who have just start smoking recently will be affected by increasing price more than those who have been smoking for a long time due to their higher nicotine addict level. So increasing the price affect strongly to the former.

Income: Besides the workers' monthly income is not significant factor. Still this factor must be considered. The result shows that the highly-paid workers have less demand for cigarettes than the lowly-paid workers. The study also reveals that a change in income hardly affects their cigarettes demand. Nevertheless the income factor is important anyway. Based on one part of the questionnaires which asked for their opinions about smoking behaviors, it finds out that the highly-paid workers have more possibility to smoke less due to awareness about their health. Except for their health concern, they still have responsibility to be a good example for their employers and juniors. Also, a lot of duties to deal with make them have less time left for smoking. All of these reasons are the cause of their declining smoking.

Furthermore, by identifying insignificant factors affecting cigarette demand, the result shows that schoolyears and sex factors slightly affect the demand for cigarettes of workers. Still the result is quite important as it supports past studies. Considering the sex factor, it is found that male smoke more than female about 0.25 cigarettes per day. Another factor which is education level (schoolyear), the result shows that workers who have a high education are likely to smoke less.

In this study, another insignificant factors have positive effect on the quantity of cigarette smoking such as false cognition toward cigarette smoking and maximum fine that smoker are willing to pay in case of violating the non-

smokers' health protection act 1992. Otherwise, the factor which has negative effect on the cigarette demand is true cognition toward cigarette smoking.

Table 4.24: The result of analyzing factors affecting cigarette demand with the OLS method.

Variable[1]	Coefficient	Std. Error	z-Statistic	Prob.
C	18.885	6.3153	2.9903	0.0035
Age**	-0.0906	0.0477	-1.8976	0.0605
Awareness*	-2.4052	0.4950	-4.8588	0.0000
Income*	-0.0003	0.0001	-0.3590	0.7203
Maxfine	0.0002	0.0001	0.9829	0.3279
Maxpriceratio*	1.3869	0.5110	2.7139	0.0078
Falsecog	0.0784	0.1369	0.5729	0.5679
Truecog	-0.1579	0.1491	-1.0594	0.2918
Price**	-0.1795	0.1019	-1.7621	0.0809
Realization	-1.5716	1.1089	-1.4172	0.1594
Schoolyears	-0.1743	0.1720	-1.0130	0.3134
Sex	0.2501	0.0933	4.8533	0.2864

Source: author's estimation.
[1]Abbreviations, field name, possible code and notation in appendix III.
Note: dependent variable: the quantity of cigarette smoking per day. (stick per day)
*Significant level at 0.05.
** Significant level at 0.10.

Table 4.24: The result of analyzing factors affecting cigarette demand with the OLS method. (Continued)

Variable[1]	Coefficient	Std. Error	z-Statistic	Prob.
Smokeyear*	0.4370	0.0638	6.8422	0.0000
Workhours**	0.4718	0.2716	1.7368	0.0853
PriceSmokeyear	-0.04297	0.5237	-2.1619	0.2849

Source: author's estimation.
[1]Abbreviations, field name, possible code and notation in appendix III.
Note: dependent variable: the quantity of cigarette smoking per day. (stick per day)
*Significant level at 0.05.
** Significant level at 0.10.

4.4 The factors affecting probability of smoking (model 3)

The descriptive analysis in section 4.1, derived from interviewing 378 workers, emphasizes that all non smokers have no plans to try smoking because they are afraid of the bad health effects caused by cigarettes, which could cause many diseases and lead to premature death. It should be noted that the information from this group of workers does not indicate anything about the factors that impact smoking behavior.

Although it is a good sign that all non-smokers have no intention to smoke in the future, the state should develop preventive measures to prevent the increase of smoking in Thailand. Therefore, more analysis is necessary to better understand the factors affecting the probability of smoking, and this means collecting more data from both smokers and non-smokers. Certainly, the behavior of smoking workers and non-smoking workers may not the same, and the goal is to determine the significant factors that affect the probability of smoking.

In this part, the objective is to identify significant factors which effect on the probability of cigarette smoking of workers, so the state can create some effective regulations and campaigns to reduce the smoking prevalence rate. Based on 378 questionnaires the factors which affect smoking behavior of industrial workers was analyzed by the binary logit model. The result is shown in table 4.25.

The factors which have positive effect on the probability of smoking consist of three factors: sex, workhours and false cognition toward cigarette smoking. The most important factor is sex, following by the number of workhours and false cognition. These three factors are discussed below.

Sex: The most significant factor which has positive effect on the probability of smoking is sex. The study reveals that men's probability of smoking is higher than women's. The result of this study supports the result of descriptive part stated that the smoking prevalence rate of male workers is much higher than female workers. Male workers have smoking prevalence about 48% while women has 5%. Without any effective by preventive measures, female worker could be a very attractive target for cigarette provider.

Workhours: Workhours is one of significant factor. The increasing number of work hours for 1 hour causes the smoker workers need to smoke and leads to increasing the probability of cigarette smoking about 0.46. Because of workers have to work so physically hard that they are under stress, so they would like to relax by smoking. This is a reason why many workers are smokers or even heavy-smokers. Also, the study shows that most of workers whose work hours are more than the regular times are likely to be smokers.

Falsecog: The insignificant factor which has positive effect on the probability of cigarette smoking is false cognition. According to table 4.25, it shows that if workers have more wrong attitude toward smoking, like smoking is cool, smart and etc, their probability of cigarette smoking will increase.

On the otherside, there are many factors have negative effect on the probability of cigarette smoking such as true cognition toward cigarette smoking, age, schoolyears, awareness of disease, realization enforcing the act and monthly income.

Truecog: The true cognition or attitude toward cigarette smoking is only the significant factor which has negative effect on the demand for cigarettes. The result shows that true cognition strongly affects the probability of cigarette smoking. It implies that if the workers have been more correctly acknowledged about cigarette smoking, like cigarette smoking effect on health of both smokers and passive smokers, smokers have higher risk to be Emphysema and Lung cancer than non-smokers and how people feel disgusted to the smokers, the probability of cigarette smoking is going to decrease.

Moreover, the non-significant factors which have negative effect on the probability of smoking including age, schoolyears, awareness of disease, realization enforcing the act and monthly income. So this study implies that the workers who are young, illiterate, lowly income and not realize enforcing the enforcement of non smoking health protection act 1992, have the probability to be the smoker.

Income: Although the income is not significant factor. But result indicates that highly paid workers have less probability of cigarette smoking than the lowly paid workers. However, the difference is very small.

The result of analyzing collected information of 378 workers by interviewing shows that the study can predict the smoking behavior of workers accurately. After getting data of workers, 275 predictions whether they are smokers or not are correct. The percentage of correctness in predicting worker's smoking behavior is 72.75%.

Table 4.25: The result of analyzing the factors affecting probability of smoking with the binary logit model method.

Variable[1]	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.2599	1.6698	-0.7545	0.4505
Age	-0.0063	0.0169	-0.3713	0.7104
Awareness	-0.0762	0.1361	-0.5597	0.5757
Income	-0.0001	0.0002	-0.5111	0.6093
Falsecog	0.0425	0.0384	1.1049	0.2692
Truecog*	-0.1193	0.0452	-2.6414	0.0083
Realization	-0.2586	0.3448	-0.7499	0.4533
Schoolyears	-0.0422	0.0484	-0.8703	0.3841
Sex*	3.1858	0.4555	6.9934	0.0001
Workhours*	0.1719	0.0783	2.1931	0.0283

Source: author's estimation.
[1]Abbreviations, field name, possible code and notation in appendix III.
Note: dependent variable: probability of cigarette smoking. (smoke = 1, non smoke = 0).
*Significant level at 0.05.

CHAPTER 5

CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Conclusions

Currently, everyone seems to understand that smoking is responsible for many deaths due to cigarette-related diseases. Concrete scientific evidence identifies clear disadvantages and negative effects from smoking, and these have been broadcasted throughout society by the Thai government and many private organizations, particularly among populations in the Bangkok metropolitan area. Ironically, it is the capital of Thailand, where measures and campaigns against smoking have been implemented quite forcefully, that has the highest smoking prevalence rate, and this rate is increasing every year. Industrial workers, especially machine operators and assemblers, tend to have the highest likelihood of being smokers, and the smoking prevalence among members of this group has continued to increase along with the rising number of cigarette-related illnesses.

The government wastes significant amounts of money every year due to costs stemming from cigarette smoking, which causes many diseases and leads to premature death. Smoking also causes many socio-economic problems. The government needs to design and implement effective and practical solutions to achieve the goal of curbing smoking in Thailand. One of the obstructions to carrying out successful measures is a lack of knowledge. Most research related to smoking problems in Thailand has been conducted on general groups of people. To develop more efficient solutions, studies need to focus more on demographic populations with high smoking prevalence rates. Thus, this research focused on a specific target group with a high percentage of smokers, industrial workers. However, in order to generate the best policies, the government needs to collect much more data to better understand the issues. This study is one piece of a larger picture that must be constructed so that initiatives achieve the goals of reducing smoking in Thailand.

The objectives of this research were to determine the significant factors that affect cigarette demand, smoker behaviors and decisions to continue or quit smoking. These factors should help policy makers to predict behavioral tendencies and future trends so that measures helpful to both smokers and non-smokers can be adopted. This research is distinctive because it focuses on industrial workers rather than minors or occupational groups with much lower smoking prevalence rates.

5.1.1 Smoking Prevalence and Cigarette Use

Industrial workers are typically performing hard physical labor in uncomfortable environments and are under a lot of stress; these workers have a tendency to smoke more than people who work in other occupations, with a smoking prevalence rate of 32.80%. Male workers in this category have a much higher smoking prevalence rate than female workers, compare 48% to 5%. In other words, for every two men, one of them is a smoker. Given this environment, female industrial workers could be a very attractive target for cigarette manufacturers if preventive measures are not taken.

According to the survey, those most likely to smoke are characterized by being young, illiterate, poor and unaware of the Non-smokers Health Protection Act. When classified by age, the figures show that smoking prevalence decreases with age. So, as industrial workers get older, they are less likely to smoke. The highest smoking prevalence is among workers 18-29 years old, approximately 34%, while older workers (42-53 years old) have the lowest rate, about 23%. Regarding education level, most industrial workers leave school before completing the primary grades. The biggest group, 52.65 percent of total workers, only finished elementary school, and the average education level of the industrial workers sampled was 7^{th} to 8^{th} grade (Matayom 1 to 2). In terms of education, the study showed that workers who finished 9^{th} grade (Matayom 3) have the highest smoking prevalence rate, about 40%, while workers who finished university have the lowest rate, approximately 22%.

The survey results suggest that awareness of regulations and fines against smoking decrease the probability of individuals smoking. The smoking prevalence rate among workers who know about the Non-smokers Health Protection Act of 1992 is 31% compared with 40% among those that are unaware of the law. Importantly, every factory provides non smoking areas as required by the government and dictated by safety concerns. Some factories have even prohibited workers from smoking during work, providing special smoking areas for breaks. Companies with these regulations issue fines and suspensions against violators, however, even with these restrictions, the percentage of smokers is quite high. Clearly, other methods are needed to discourage smoking. For example, the Non-smokers Health Protection Act does not cover the entire factory compound; despite its prohibition of smoking in the building, workers can still smoke in other areas around the factory. Thus, this law has little affect on smokers.

Based on cigarette use habits, it would seem that many industrial workers are quite addicted to nicotine; 11 years is the average length of time for the smokers in this group, and degree of addiction is indicated by the number of years a person has been smoking. According to the survey, smokers buy cigarettes at an average price of 33.16 Bahts per pack and some smokers will spend as much as 40 Bahts for a pack of cigarettes. Within one day,

industrial workers smoke an average of 10 cigarettes, and some smoke as many as 30. Since the average worker is smoking ½ a pack per day, this means that more than 10% of the smokers' wage, approximately 150 Bahts per day, is supporting an unhealthy and otherwise costly habit. It seems probable that the likelihood for industrial workers to smoke would increase if they had more purchasing power, yet current prices do not seem to be high enough to deter workers from smoking.

5.1.2 Disease Awareness: Smoking Cognition, Age and Working Hours

One of significant factors that encourages smokers to reduce their cigarette demand is perception about the risks of tobacco to their health. With this awareness, some workers try to avoid any behaviors involving smoking. When smokers realize the dangers and bad effect of cigarette smoking, for example how it could harm their social status and health, they are more likely to pursue ways to better care for themselves. The study found that a 1% increase in the degree of disease awareness can induce a 2.4% decrease in the demand for cigarettes. This is an important result to investigate further as it suggests one direction that government directives should take. Behaviors are based on beliefs, and outcomes of this research imply that with proper education about cigarette smoking (e.g. effects of first-hand and second-hand smoke on health, higher risks of emphysema and lung cancer, and attitudes of disgust regarding smokers), the prevalence of smoking is likely to decrease.

The study also found that a 1% increase in the true attitude toward cigarette smoking can decrease cigarette demand by 0.16%. True cognition has a strong effect on the probability of cigarette smoking. The study showed that workers have a 0.53 probability of not smoking when they have more a true understanding of the risk of cigarette smoking. On the other hand, false cognition is not as powerful in decreasing smoking; if wrong attitudes toward cigarette smoking are reduced by introducing industrial workers to correct their false attitudes, the probability of not smoking is 0.47. In summary, this study implies that true cognition toward cigarette smoking is a more efficient factor than false cognition to reflect in designing policy initiatives to reduce the smoking prevalence rate.

The interviews supported the hypothesis that as smokers get older, they become more aware of how smoking adversely affects their health, and they smoke less. Thus, it would seem that if higher degrees of awareness regarding cigarette-related diseases could be achieved, cigarette consumption could be reduced further.

Additionally, the interviews highlighted that most smokers use cigarette smoking as a way of relaxing. Whenever they feel worried, tense or encounter hard problems, they turn to smoking to help them calm. The results of the research indicate that a 1% increase in work hours per day leads to a 0.5%

increase in demand for cigarettes. The study suggests that those industrial workers who have regular working hours are likely to have relatively low smoking rates, due to less stress, compared to those who work long hours.

5.1.3 Disease Awareness: Non-smoking Areas and Smoking Behavior

One of significant factors that encourages smokers to quit smoking is disease awareness. According to interviews, the most common reason for the industrial workers studied (85.9%) to give up smoking is the awareness of health hazards due to cigarette smoking. On the other hand, the most important reason (91.3%) why smokers do not have any intention to quit smoking is their belief that smoking makes them more relaxed.

Moreover, the study indicates that despite regulations limiting smoking areas, some workers still smoke in non-smoking areas, such as toilets and canteens. If all factories were designated to have non-smoking areas similar to public places, it more likely that smoking rates would decrease since workers spend most of their day (8.00 – 23.00) at their factories. As mentioned above, the Non-smokers Health Protection Act of 1992 does not prohibit smoking on the entire factory compound, only in the building, which weakens its impact. According to the interviews, many smokers use the toilets and note that the new regulations have hardly had any affect on them.

On a positive note, the study suggests that non-smokers have no plans to try smoking in the future. This group seems to be clearly aware of the severe costs of smoking, which raises the important issue of how to improve the awareness of current smokers to reduce their demand for cigarettes. Given the results noted above, this is a significant factor to encourage smokers to quit. When people realize the dangers and negative effects of cigarette smoking, such as harms to social status and health, they are more likely to change their habits.

5.1.4 Monthly Income and Price

This study produced a coefficient of income that is different from the income elasticity generated by former research based on different populations. This study found that higher paid workers have less demand for cigarettes than lower paid workers. It seems that an increase in income of 1% results in an insignificant demand decrease of 0.0003%, suggesting that changes in income have little affect on cigarette demand.

There has been much research regarding the elasticity of demand for cigarettes across the general population. For example, Isra (2002) used data from the household socioeconomic survey, 2000(SES2000) and various pric data sets to analyze demand for cigarettes, found that a 1% increase in income will lead to a 0.7% increase in demand for cigarettes.

For industrial workers, this price mechanism does not work. In considering the factors that are not so significant in curbing smoking, it seems that raising the price of cigarettes only slightly affects the demand for cigarettes. Nevertheless, raising cigarette prices does positively change the behavior of some smokers, and this study supports the demand theory. The results of the research suggest that increasing cigarette prices leads to curbing smokers' daily consumption, indicating a 0.12% decrease in demand for every 1% increase in price. This study confirms that when prices are beyond smokers' means, they are likely to smoke less. However, as tobacco is an addictive product, heavy smokers keep buying cigarettes at the same levels. Moreover, the study shows that workers who have started smoking recently will be more affected by price increases than those who have been smoking for a long time.

5.2 Policy Recommendations

The factors discussed in this thesis should be considered quite relevant to the process of identifying suitable measures to get workers to quit smoking. Government policies should be aimed at encouraging non-smokers not to try cigarettes and at finding new approaches for launching effective anti-smoking campaigns. Reducing the smoking problem in Thailand will greatly improve the country in many ways. Importantly, there are substantial economic benefits, both direct and indirect, to be gained.

Direct benefits would be recognized by reductions in government spending to provide public health services for patients suffering from smoking-related diseases. These medical expenses include health care costs, transportation and so forth. This would allow for spending in other areas such as economic development to stimulate production, investment and consumption. There are also collateral benefits. Productivity will improve with a healthier labor force. Health has a direct impact on the quantity and quality of work, especially in terms of reducing absenteeism which means increasing income. As a result of labor productivity increases, Thai industries would become more competitive, which would further boost gross domestic product.

Policy makers must learn more about the factors related to smoking behaviors of workers so that they can implement practical guidelines for employers, employees and entrepreneurs. Better understanding of the issues involved will allow for initiatives to be implemented that will decrease the smoking prevalence among workers and maximize benefits for Thailand. Based on this study, it seems that a targeted education plan that increases workers' knowledge of the dangers of smoking cigarettes could be quite successful. The government should also establish a set of guidelines for how to quit smoking.

As the analysis above suggests, when smokers are made aware of the severity of cigarette-related diseases as well as that their smoking also harms

others, they are encouraged to reduce their smoking. The degree of awareness of the individual is directly correlated with his/her probability of smoking. When smokers realize how their illnesses could destroy their health or social status, they often become motivated to take care of themselves. Since workers are making their own decisions about how to behave appropriately to protect themselves from diseases, a solid health education program should concentrate on clearly explaining the dangers of smoking, including providing strategies to quit smoking and encouraging non-smokers not to try smoking. Health education initiatives should focus on three topics:

a) Perceptions about the risks of becoming ill due to cigarette smoking because they are key factors in determining health care behaviors.

b) Perceptions of the severity of smoking-related diseases because awareness of the risks may not change behaviors if there is no recognition of how detrimental these illnesses are to health or social status. Proper insight will likely activate smokers, making them more concerned about their behaviors and leading them to take practical measures to stop smoking.

c) Suitable approaches to quit smoking along with their advantages because nicotine is an addictive substance, which means it is not easy for most smokers to stop.

There are many other reasons to support the use of a targeted education policy to reduce cigarette demand and decrease smoking prevalence rates among workers. Survey results show that the appropriate cognition or belief about cigarette smoking can lead to non-smoking behavior since belief is a partial component of attitude. When someone has a particular feeling toward a person or thing, he/she will assess value and hold this firmly in their mind. Subsequent behaviors are directly related to these beliefs. Therefore, the government should publicize important information about smoking to workers to correct their misconceptions.

Furthermore, if the government wants to do more to reduce smoking, policy makers should consider how to better influence the youth with anti-smoking campaigns; targeting this group would likely impact young workers. Companies should implement strong policies against smoking, prohibiting workers from smoking around the workplace and enforcing the rules by fining or firing violators; it is recommended that organizations even go as far as to favor new recruits who are non-smokers. These measures will help protect young workers from cigarettes.

According to the study, it would seem that older workers would be likely to attend smoking cessation programs given their concerns about health. Thus, anti-smoking campaigns should target older workers, too, but in a different manner. Importantly, developing a team of trained volunteers to advise and support smokers who are trying to quit smoking is critical. It would

also be helpful to have the anti-smoking project partially under the supervision of doctors.

The government should also force factories to issue and enforce anti-smoking regulations by punishing the business owners who are in violation. Pushing companies to provide their employees with relaxing and entertaining activities would be a positive step towards balancing the stress that seems to promote smoking. Given that working hours are positively correlated with smoking, the government should ensure that workers are given periodic breaks to ease their nervous tension. Providing sports activities at the factory site would provide alternatives to smoking, and ideally reduce absenteeism as discussed above.

It is not sufficient to simply restrict smoking areas. Anti-smoking initiatives need to promote mental and physical health. When people are sound of mind and body, they are happy and their work quality and behaviors reflect this attitude. Good health means less sickness, less absence and less use of public health services. This means that the government can redirect money to more productive projects to develop Thailand socially and economically.

The government should better inform the public about the Non-smokers Health Protection Act of 1992 and apply it more seriously. If the law was strengthened to include the entire factory compound, it is likely that non-smoking behavior would increase. The government should issue measures requiring every company to have non-smoking areas, and all public places should be designated as such. Using all forms of media to acknowledge legal policies designed to reduce smoking is very important; this includes not only radio, TV and print materials, but also posters and leaflets at factory sites.

Moreover, the government should create effective preventive measures with an emphasis on female workers who currently represent a small proportion of smokers. Shopkeepers can be helpful in this manner by not selling cigarettes to pregnant women, and the government can force tobacco manufacturers to print warning message on their packages, highlighting the severe effects of smoking on health and beauty. Premature aging, darkened lips and yellow teeth are among the many negative effects to appearance that result from smoking. The prevalence of smoking among female industrial workers is now only about 5%. While men make up most of the smoking population, the lack of effective measures could make female workers a target for cigarette providers.

Finally, given that the survey suggests that non-smokers have no intention of trying cigarettes in the future, it makes sense for the government to focus its attention on smokers more so than non-smokers.

5.3 Future Research Suggestions

Given that this study was limited to interviewing only a few workers in each factory, due to time limits and budgetary constraints, I would encourage further research into factors affecting cigarette smoking among industrial workers. Ideally, these studies would cover other industrial settlements so that the data can be more accurate and sufficient.

Certainly, there is also a need for research targeting other segments of the working population. Clearly, the issues that face industrial workers are quite different from those that service or office workers face. While it can be expected that some issues will be quite similar, there is a need for more richness and specificity in the data about smokers and non-smokers across all industries. Finally**,** the more accurate results provide useful information to the policy makers for creating many effective measures to reduce the cigarette smoking problem.

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APPENDICES

APPENDIX I

QUESTIONNAIR No.....

Analysis of cigarette demand of the industrial workers
in Bang Khun Thian district of Bangkok Metropolis

Note: An objective of questionnaire is to investigate factors which affect cigarette smoking in industrial workers at Bang Khun Thian district. Every answer is important and helpful:

1) To find out the factors affecting probability of smoking habit in industrial workers

2) To find out the factors affecting cigarette demand of industrial workers

3) To find out the factors affecting the probability of quitting smoking in industrial workers at Bang Khun Thian district currently

4) To find out the factors affecting probability of not trying to smoke of non-smokers in industrial workers at Bang Khun Thian district currently

To gain the highest advantage for whom this issue concerned, like employers and workers of factory including workers' family, it's necessary to answer all questions honestly. All data is going to be analyzed carefully to help a government produce policy of quit smoking and prevent non-smokers from smoking. Your answers are so helpful.

Factory type.....

Address .....

Date.....

Part 1

Please indicate your choice by marking X in the box(es) that best reflects your choice

1. Are you a smoker at the present time?
   □ Yes
   □ No

Part 2 General data about interviewee

Please indicate your choice by marking X in the boxes and filling your answer in the blank that best reflects your choice.

2. Age …… years old

3. Sex □ Male □ Female

4. Education level……

5. Number of work hours per day ……hours/day

6. Salary …….baht/month

7. Is there a non-smoking area provided in your factory compound?
   □ Yes □ No

8. Have you ever been informed about enforcement of non-smokers' health protection act 1992?
   □ Yes □ No

9 How long have you been smoking?.....Year (a smoker only)

10. How much is a pack of cigarette that you smoke at present time?.....Baht. What is the highest price of cigarette per pack that you are willing to buy, suppose that a government increases price of cigarette which you smoke at present time?)..... Baht, if a price of cigarette is higher than maxprice, smokers will stop buying. (a smoker only)

11 According to a non-smokers' health protection act 1992 which is implemented in Thailand currently, it stated that anyone who smokes in non-smoking area shall be fined around 2,000 Baht. What is the highest fine that you are willing to pay in case of violating, suppose that a government revise to set a higher fine?……Baht which means that If a fine rate is higher than maxfine, smokers will obey regulations instead of paying fine. (a smoker only)

12. How many cigarettes do you usually smoke per day?..... Stick/day
(a smoker only)

Part 3 Decision of interviewee

Please indicate your choice by marking X in the boxes that best reflects your choice

13. Do you have any plan to quit smoking in the future? (a smoker only)

□Yes, I will try to quit smoking (Go to answer number 15)
□No, I will continue to smoke (Go to answer number 16)

14. Do you think you might try to smoke in the future? (a non-smoker only)

□ No, I will never try to smoke (Go to answer number 17)
□ Yes, I will try to smoke (Go to answer number 18)

15. Why do you want to quit smoking?
Please indicate your choice by marking ⁄ to indicate your reason for smoking cessation.

	Factor	Yes	No
15.1	My partner and family asked me to quit.		
15.2	It is bad for my health.		
15.3	It makes me less fit.		
15.4	I am sick, so I quit as my doctor's advice.		
15.5	It is bad for the health of people near me		
15.6	I need to save some money.		
15.7	I believe that people disapprove of smoking.		
15.8	I take a non smoking campaign seriously.		
15.9	It's hard to smoke since smoking in public is prohibited.		
15.10	It's hard to smoke because of limited smoking area in workplace.		
15.11	Please write your other reasons (if any)…		

Go to answer number 19

16. Why do you want to continue to smoke?
Please indicate your choice by marking／to indicate your reason for continuing to smoke.

	Factor	Yes	No
16.1	I can't resist the craving for a cigarette		
16.2	I doubt smoking is bad for health.		
16.3	People around me smoke.		
16.4	It helps me relax and ease distress.		
16.5	I would be bored if I quitted smoking.		
16.6	It helps me think clearer and smarter.		
16.7	I might be incapable to quit.		
16.8	I think I am too addicted to cigarettes		
16.9	Please write your other reasons (if any)…		

Go to answer number 19

17. Why do you never want to try a smoke?
Please indicate your choice by marking／to indicate your reason that you never try a smoke

	Factor	Yes	No
17.1	If I smoked, I am more likely to become ill in the future		
17.2	My partner and family don’t approve.		
17.3	I’ve realized that smoking cause a heart disease and lung cancer.		
17.4	Please write your other reasons (if any)…		

Go to answer number 19

18. What are reasons that make you decide to try a smoke in the first place?
Please indicate your choice by marking／to indicate your reason that you try a smoke in the first place.

	Factor	Yes	No
18.1	I think it make me look cool.		
18.2	I think smokers have better personality than non-smokers.		
18.3	I think smokers were popular and approved from society generally.		
18.4	My friends and family smoke.		
18.5	Please write your other reasons (if any)…		

Go to answer number 19

19. Please read factors below and indicate your choice by marking / to indicate how these factors affect your smoking habit.

	Factor	Not important	Hardly important	Quite important	Very important
19.1	Be forbidden to smoke during work				
19.2	People around me ask me not to				
19.3	It is bad for my health				
19.4	It is bad for my family's health				
19.5	Limited smoking area provided in workplace				
19.6	Limited smoking area provided in public				
19.7	People disapprove of smoking				
19.8	Quit smoking campaign shown in TV and radio				
19.9	Quit smoking campaign shown in printed media				
19.10	Sticker or sign of non smoke area				
19.11	Censored smoking scene in TV				
19.12	Be fined due to violating factory regulation				
19.13	Decreasing work hours				
19.14	Religious belief				

20. According to a declaration of Public Health Ministry, issued on January 19, 2004(B.E. 2547), about agreement and condition of its label and content on a package of cigarette under Tobacco Product Regulation Act 1992 (B.E. 2535) stated that all brands of cigarette shall be required caution about danger caused by smoking with a combination of pictures and/or six messages below together.

Please read warning below and indicate your choice by marking / to indicate how they affect your smoking habit.

	Caution	Not important	Hardly important	Quite important	Very important
20.1	Premature ageing				
20.2	Bad for children health				
20.3	Breath smell				
20.4	Risk for emphysema				
20.5	Serious health hazard				
20.6	Risk for lung cancer				

21. Attitude toward smoking
Please read and indicate your choice by marking / that best reflects your choice

	Attitude	Totally agree	Agree	Doubtfully	Disagree	Totally Disagree
21.1	Its smoke affect the health of both smokers and passive smokers					
21.2	Parent should set an example to kids by not smoking.					
21.3	Smoking increases the risk for serious health hazard					
21.4	Smokers have higher risk to be emphysema and lung cancer than non-smokers.					
21.5	Just smoking a couple of cigarettes per day was bad for health.					
21.6	It will be good for you and your family, if you quit smoking.					

21.7	When I don't smoke, I feel agitated.					
21.8	Smoking helps me socialize with my friends.					
21.9	Smoking makes me attractive.					
21.10	Regular exercise can protect illness caused by cigarette.					
21.11	Smoking makes me feel bright and fresh.					
21.12	Having a cigarette, a match and a lighter makes me look fashionable.					

22. Fact about smoking
Please choose only one answer and mark x in the box.

22.1 Who has got a harmful effect from your smoking?
□ only you
□ your family who is around you when you are smoking
□ your colleagues who work at the same area when you are smoking
□ all answers mentioned above are correct

22.2 Which kind of cigarette smoke is the most harmful to your help?
□ smoke that smokers inhale
□ smoke from lit cigarette
□ smoke that smokers exhale
□ every kind of cigarette smoke

22.3 Which one is correct?
□ smoker's lips are usually darker than non-smoker's
□ smokers usually have crow's feet at early age
□ smoker's teeth are usually yellowish, or even black if he keeps smoking for a long time, and his breath smell
□ all answers mentioned above are correct

22.4 Which type of cancers caused by smoking is considered as the top five causes of death in Thailand?
□ lung cancer
□ oral cancer
□ esophagus cancer
□ C.A cervix

22.5 What is the harmful effect from smoking?

□ Affecting optic nerve, a smoker is likely to be blind

□ it narrows some blood vessels in limbs result in losing limbs.

□ make endocrine gland work improperly and result in diabetes

□ have a gallstone in bladder and kidney

APPENDIX II

แบบสอบถาม เลขที่.....

เรื่อง
วิเคราะห์อุปสงค์บุหรี่
ของ
คนงานในโรงงานเขตบางขุนเทียน, กรุงเทพมหานคร

คำชี้แจง: แบบสอบถามนี้สร้างขึ้นเพื่อสำรวจปัจจัยที่มีผลต่อการสูบบุหรี่ของคนงานในโรงงานเขตบางขุนเทียน คำตอบที่ได้จะเป็นประโยชน์อย่างยิ่งในการนำมาประมวลผลดังนี้

1) เพื่อให้ทราบถึงปัจจัยที่มีผลต่อความน่าจะเป็นของการสูบบุหรี่ของคนงาน
2) เพื่อให้ทราบถึงปัจจัยที่มีผลต่อปริมาณการสูบบุหรี่ของคนงาน
3) เพื่อให้ทราบปัจจัยที่มีผลต่อความน่าจะเป็นของการสูบบุหรี่หรือไม่สูบบุหรี่ในอนาคตของคนงานในโรงงานเขตบางขุนเทียนที่สูบบุหรี่ในปัจจุบัน
4) เพื่อให้ทราบปัจจัยที่มีผลต่อความน่าจะเป็นที่จะลองหรือไม่ลองสูบบุหรี่ของคนงานในโรงงานเขตบางขุนเทียนที่ไม่สูบบุหรี่ในปัจจุบัน

เพื่อให้มีการประสานผลประโยชน์แก่ผู้ที่เกี่ยวข้องทั้งหลาย คือโรงงาน , คนงาน รวมทั้งสุขภาพของครอบครัวคนงานด้วย มิให้เกิดผลกระทบมากจนเกินไป โดยจะเป็นแนวทางแก่รัฐบาลในการสร้างนโยบายการเลิกสูบบุหรี่ และการป้องกันไม่ให้ผู้ที่ไม่สูบบุหรี่เปลี่ยนพฤติกรรมมาสูบบุหรี่ จึงขอความร่วมมือเพื่อถามคำถามเกี่ยวกับหัวข้อดังกล่าวนี้

ประเภทโรงงานที่สัมภาษณ์.....
สถานที่ทำการสัมภาษณ์.....
วันที่สัมภาษณ์.....

ส่วนที่ 1

โปรดกา ✕ ลงใน □ ที่เหมาะสมกับคำตอบของท่าน

1.ปัจจุบันคุณสูบบุหรี่หรือไม่

□ สูบ

□ ไม่สูบ

ส่วนที่ 2 ข้อมูลทั่วไปของผู้ให้สัมภาษณ์

โปรดกา ✕ ลงใน □ ที่เหมาะสมกับคำตอบของท่านและเติมคำตอบลงใน **……**

2.อายุ **……** ปี

3.เพศ □ ชาย □ หญิง

4.ระดับการศึกษา ……

5.คุณทำงานวันละกี่ชั่วโมง……ชั่วโมง

6.กรุณาระบุรายได้ต่อเดือนในปัจจุบันของคุณ……บาท

7.ในโรงงานที่คุณทำงานมีเขตปลอดบุหรี่หรือไม่ □ มี □ ไม่มี

8.คุณทราบหรือไม่ว่ารัฐบาลได้ออกพระราชบัญญัติคุ้มครองผู้ไม่สูบบุหรี่ในที่สาธารณะ

□ ทราบ □ ไม่ทราบ

9.คุณสูบบุหรี่มาเป็นระยะเวลานานเท่าไร.....ปี(คำถามเฉพาะคนที่สูบบุหรี่)

10.ปัจจุบันคุณซื้อบุหรี่ซองละกี่บาท.....บาท,หากรัฐบาลขึ้นราคาบุหรี่ยี่ห้อที่คุณสูบประจำในปัจจุบันคุณคิดว่าราคาบุหรี่สูงที่สุดที่คุณจะยังคงซื้ออยู่ซองละกี่บาท..... บาท,ถ้าราคาสูงกว่านี้คุณจะไม่ซื้อแล้ว(คำถามเฉพาะคนที่สูบบุหรี่)

11.ปัจจุบันประเทศไทยใช้พระราชบัญญัติคุ้มครองผู้ไม่สูบบุหรี่ปีพ.ศ.2535 กล่าวว่าห้ามมิให้ผู้ใดสูบบุหรี่ในเขตปลอดบุหรี่หากฝ่าฝืนมีโทษปรับ 2,000 บาท หากรัฐบาลขึ้นค่าปรับ คุณคิดว่า ค่าปรับสูงที่สุดกี่บาทที่คุณยินดีจะจ่ายเพื่อละเมิดกฎกี่บาท……บาท, ถ้าค่าปรับสูงกว่านี้คุณจะไม่จ่ายแล้วและยอมปฏิบัติตามกฎ(คำถามเฉพาะคนที่สูบบุหรี่)

12.คุณสูบบุหรี่วันละกี่มวน.....มวน(คำถามเฉพาะคนที่สูบบุหรี่)

ส่วนที่ 3 การตัดสินใจของผู้ให้สัมภาษณ์

โปรดกา ✕ ลงใน □ ที่เหมาะสมกับคำตอบของท่าน

13.ในอนาคตคุณจะเลิกสูบบุหรี่หรือไม่เลิกสูบบุหรี่ (คำถามเฉพาะคนที่สูบบุหรี่ในปัจจุบัน)

□ เลิกสูบบุหรี่ (ข้ามไปตอบคำถามข้อ15)

□ ไม่เลิกสูบบุหรี่(ข้ามไปตอบคำถามข้อ16)

14. ในอนาคตคุณจะสูบบุหรี่หรือไม่ (คำถามเฉพาะคนที่ไม่สูบบุหรี่ในปัจจุบัน)

□ ไม่สูบบุหรี่แน่นอน(ข้ามไปตอบคำถามข้อ17)

□ จะลองสูบบุหรี่ดู(ข้ามไปตอบคำถามข้อ18)

15.สาเหตุที่ทำให้คุณจะเลิกสูบบุหรี่คือ

โปรดทำเครื่องหมาย / ในช่องว่าง เพื่อระบุว่าใช่สาเหตุของการเลิกสูบบุหรี่หรือไม่

	ปัจจัย	ใช่	ไม่ใช่
15.1	แฟนหรือสมาชิกในครอบครัวขอร้อง		
15.2	กลัวเป็นคนสุขภาพไม่ดี		
15.3	รู้สึกว่าร่างกายอ่อนแอลง		
15.4	เป็นโรคแล้วแพทย์แนะนำให้งดสูบบุหรี่		
15.5	สุขภาพของสมาชิกในครอบครัวอ่อนแอลง		
15.6	ต้องการประหยัด		
15.7	เชื่อว่าสังคมไม่ยอมรับผู้สูบบุหรี่		
15.8	ปฏิบัติตามกรรณรงค์ไม่สูบบุหรี่		
15.9	ไม่สะดวกที่จะสูบเนื่องจากการห้ามสูบบุหรี่ในที่สาธารณะ		
15.10	ไม่สะดวกที่จะสูบเนื่องจากการจำกัดพื้นที่สูบบุหรี่ในที่ทำงาน		
15.11	อื่น ๆโปรดระบุ		

ข้ามไปข้อที่ 19

16.สาเหตุที่ทำให้คุณไม่เลิกสูบบุหรี่คือ

โปรดทำเครื่องหมาย / ในช่องว่าง เพื่อระบุว่าใช่สาเหตุของการไม่เลิกสูบบุหรี่หรือไม่

	ปัจจัย	ใช่	ไม่ใช่
16.1	จิตใจไม่เข้มแข็งพอ		
16.2	ไม่คิดว่าการสูบบุหรี่จะทำให้เกิดโรคร้าย		
16.3	เห็นคนรอบข้างก็ยังสูบอยู่		
16.4	คิดว่าการสูบบุหรี่จะทำให้คลายเครียดหรือลดความวิตกกังวลได้		
16.5	คิดว่าการสูบบุหรี่จะทำให้คลายเหงา		
16.6	คิดว่าการสูบบุหรี่จะช่วยเพิ่มประสิทธิภาพในการคิดหรือใช้สมอง		
16.7	ไม่คิดว่าตนเองจะทำได้		
16.8	เป็นอาการติด หรือหากไม่สูบจะหงุดหงิด		
16.9	อื่นๆโปรดระบุ		

ข้ามไปข้อที่ 19

17.สาเหตุที่ทำให้คุณไม่ลองสูบบุหรี่คือ

โปรดทำเครื่องหมาย / ในช่องว่าง เพื่อระบุว่าใช่สาเหตุของการไม่ลองสูบบุหรี่หรือไม่

	ปัจจัย	ใช่	ไม่ใช่
17.1	คิดว่าการสูบบุหรี่เป็นการฆ่าตัวตายแบบผ่อนส่ง		
17.2	แฟน หรือ ญาติไม่ให้สูบ		
17.3	ทราบว่าการสูบบุหรี่จะทำให้เป็นโรคหัวใจ,โรคมะเร็งปอด		
17.4	อื่นๆโปรดระบุ ..... ……		

ข้ามไปข้อที่ 19

18.สาเหตุที่ทำให้คุณลองสูบบุหรี่ คือ

โปรดทำเครื่องหมาย / ในช่องว่าง เพื่อระบุว่าใช่สาเหตุของการลองสูบบุหรี่หรือไม่

	ปัจจัย	ใช่	ไม่ใช่
18.1	คิดว่าการสูบบุหรี่เป็นการแสดงออกถึงความโก้เก๋		
18.2	คิดว่าคนที่สูบบุหรี่จะมีบุคลิกภาพที่ดีกว่าคนไม่สูบบุหรี่		
18.3	คิดว่าคนสูบบุหรี่จะเป็นคนกว้างขวางหรือเป็นที่รักของคนทั่วไปในสังคม		
18.4	อยากสูบตามอย่างเพื่อนหรือญาติ		
18.5	อื่นๆโปรดระบุ		

ข้ามไปข้อที่ 19

19.อ่านปัจจัยต่างๆ ทีละปัจจัยและ กรุณาระบุว่าปัจจัยต่างๆ นี้นั้น มีผลต่อพฤติกรรมการสูบบุหรี่ของคุณหรือไม่

โปรดทำเครื่องหมาย / ในช่องว่าง เพื่อระบุว่ามีผลต่อพฤติกรรมการสูบบุหรี่มากน้อยปานกลางหรือไม่มีผลต่อพฤติกรรมการสูบบุหรี่ของคุณ

	ปัจจัย	ไม่มีผล	มีผลน้อย	มีผลปานกลาง	มีผลมาก
19.1	การห้ามสูบบุหรี่ในเวลาทำงาน				
19.2	คำขอร้องจากสมาชิกในครอบครัว				
19.3	สุขภาพของคุณอ่อนแอลง				
19.4	สุขภาพของสมาชิกในครอบครัวอ่อนแอลง				
19.5	การจำกัดพื้นที่การสูบบุหรี่ในโรงงาน				
19.6	การจำกัดพื้นที่สูบบุหรี่ตามที่สาธารณะ				
19.7	การไม่ยอมรับผู้สูบบุหรี่จากสังคมรอบข้าง				

19.8	การรณรงค์เพื่องดสูบบุหรี่ผ่านโฆษณาโทรทัศน์ และวิทยุ				
19.9	การรณรงค์เพื่องดสูบบุหรี่ผ่านสื่อสิ่งพิมพ์ต่างๆ				
19.10	การติดสติ๊กเกอร์หรือป้ายห้ามสูบบุหรี่ตามที่ต่างๆ				
19.11	การห้ามเผยแพร่ภาพท่าทางการสูบบุหรี่ในโทรทัศน์				
19.12	การหักค่าจ้างในกรณีที่ทำผิดกฎของโรงงาน				
19.13	การลดจำนวนชั่วโมงการทำงานลง				
19.14	คำสอนและกฎข้อบังคับของศาสนาพุธ อิสลาม คริสต์ อื่นๆ				

20.ประกาศกระทรวงสาธารณสุขฉบับที่8 เมื่อวันที่19 มกราคม พ.ศ.2547 เรื่อง หลักเกณฑ์วิธีการและเงื่อนไขการแสดงฉลากและข้อความในฉลากของบุหรี่ซิกาแรตตามพระราชบัญญัติควบคุมผลิตภัณฑ์ยาสูบ พ.ศ.2535โดยบุหรี่ทุกยี่ห้อต้องมีฉลากรูปภาพและข้อความคำเตือนถึงพิษภัยบุหรี่6แบบคละกันไป

อ่านคำเตือนต่างๆ ทีละข้อ และกรุณาระบุว่าคำเตือนต่างๆ มีผลต่อพฤติกรรมการสูบบุหรี่ของคุณหรือไม่ โปรดทำเครื่องหมาย / ในช่องว่างเพื่อระบุว่า มีผลมาก น้อย ปานกลาง หรือไม่มีผล ต่อพฤติกรรมการสูบบุหรี่ของคุณ

	คำเตือนบนซองบุหรี่ที่กล่าวว่า	ไม่มีผล	มีผลน้อย	มีผลปานกลาง	มีผลมาก
20.1	สูบแล้วแก่เร็ว				
20.2	ควันบุหรี่จะทำร้ายลูก				
20.3	สูบแล้วจะมีกลิ่นปาก				
20.4	สูบแล้วถุงลมพองตาย				
20.5	ควันบุหรี่ฆ่าคนตายได้				
20.6	ควันบุหรี่ทำให้เกิดมะเร็งปอด				

21.ความเชื่อเรื่องบุหรี่

โปรดทำเครื่องหมาย/ ลงในช่องที่ตรงกับความรู้สึกความคิดเห็นและความเชื่อของท่านมากที่สุดเพียงช่องเดียว

	ข้อความ(ความเชื่อในทางบวก)	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
21.1	ควันบุหรี่มักมีผลต่อสุขภาพของบุคคลข้างเคียงที่ไม่สูบบุหรี่ได้เช่นเดียวกับผู้สูบบุหรี่					
21.2	พ่อและแม่ควรจะเป็นตัวอย่างที่ดีแก่บุตรโดยไม่สูบบุหรี่					
21.3	การสูบบุหรี่เป็นการฆ่าตัวตายแบบผ่อนส่ง					
21.4	ผู้ที่สูบบุหรี่มีโอกาสจะเป็นโรคถุงลมโป่งพองหรือมะเร็งปอดได้สูง					

21.5	การสูบบุหรี่เพียงวันละ 1-2 มวน ก็จะเป็นอันตรายต่อร่างกาย					
21.6	ถ้างดสูบบุหรี่ได้จะเป็นผลดีต่อสุขภาพอนามัยของตนเองและครอบครัว					
21.7	การงดสูบบุหรี่จะทำให้เกิดอาการกระวนกระวายใจอย่างมาก					
	ข้อความ(ความเชื่อในทางลบ)	เห็นด้วยอย่างยิ่ง	เห็นด้วย	ไม่แน่ใจ	ไม่เห็นด้วย	ไม่เห็นด้วยอย่างยิ่ง
21.8	การสูบบุหรี่เป็นการสร้างมิตรภาพระหว่างเพื่อนให้ดำรงอยู่					
21.9	การสูบบุหรี่เป็นการดึงดูดใจเพศตรงข้าม					
21.10	การออกกำลังกายอย่างสม่ำเสมอจะป้องกันการเกิดโรคจากการสูบบุหรี่ได้					
21.11	การสูบบุหรี่ทำให้สมองสดชื่นแจ่มใส					
21.12	การมีบุหรี่/ไม้ขีดไฟ ไฟแชค ติดตัวอยู่เสมอทำให้เป็นคนที่ทันสมัย					

22.ความรู้เกี่ยวกับบุหรี่

โปรดเลือกข้อความที่เห็นว่าถูกต้องที่สุดเพียงข้อเดียว แล้วกา ✕ ลงใน □

22.1ท่านคิดว่าการสูบบุหรี่มีอันตรายต่อผู้ใดบ้าง

□ตัวท่านเองซึ่งเป็นคนสูบบุหรี่

□คนในครอบครัวของท่านที่อยู่กับท่านขณะที่ท่านกำลังสูบบุหรี่

□เพื่อนร่วมงานที่ทำงานอยู่ในที่เดียวกับท่านขณะที่ท่านกำลังสูบบุหรี่

□ถูกทุกข้อ

22.2 ควันบุหรี่ที่เป็นอันตรายต่อสุขภาพมากที่สุด คือควันบุหรี่ชนิดอะไร

□ ควันบุหรี่ที่ผู้สูบสูดเข้าไป

□ ควันบุหรี่ที่ออกมาจากบุหรี่ที่จุดทิ้งไว้เท่านั้น

□ ควันบุหรี่ที่ผู้สูบพ่นออกมาเท่านั้น

□ ควันบุหรี่ทุกชนิดที่เกิดจากการเผาไหม้ของบุหรี่

22.3 ข้อใดกล่าวถูกต้อง

□ผู้ที่สูบบุหรี่ริมฝีปากเขียวคล้ำกว่าคนทั่วไป

□การสูบบุหรี่ทำให้ตีนกาเกิดเร็วขึ้น

□ผู้ที่สูบบุหรี่ทำให้ฟันมีสีเหลือง ถ้าสูบนนานๆฟันจะมีสีดำทำให้เกิดกลิ่นปาก

□ถูกทุกข้อ

22.4โรคมะเร็งชนิดใดที่เกิดจากการสูบบุหรี่และทำให้คนไทยตายมากที่สุดติด5อันดับแรกของประเทศไทย

□ มะเร็งปอด

□มะเร็งที่ช่องปาก

□ มะเร็งหลอดอาหาร

□ มะเร็งปากมดลูก

22.5 ผลจากการสูบบุหรี่ที่มีต่อร่างกายคือ

□ ระบบประสาทที่มาเลี้ยงตาผิดปกติทำให้ตาบอดได้

□ เส้นเลือดบริเวณแขนขาตีบ ทำให้แขนขาเน่า อาจต้องตัดทิ้งได้

□ ต่อมไร้ท่อทำงานผิดปกติ อาจทำให้เป็นเบาหวาน

□ เป็นนิ่วในกระเพาะอาหารและที่ไต

APPENDIX III

ABBREVIATIONS, FIELD NAME, POSSIBLE CODE AND NOTATION

Field	Field name	Possible code	Meaning	Unit
Age	Age			Years old
Degree of awareness of diseases	Awareness		Degree of awareness about health hazards due to smoking	Point
Monthly income	Income			Baht/month
Highest fine that willingness to pay	Maxfine		If a fine rate is higher than maxfine, smokers will obey regulations instead of paying fine.	Baht
Highest price of cigarette per pack that willingness to buy	Maxprice		If a price of cigarette is higher than maxprice, smokers will stop buying.	Baht
The ratio of willingprice and actualprice	Maxpriceratio		The ratio of Highest price of cigarette per pack that willingness to buy and price of cigarette per pack	
False cognition or false attitude toward cigarettes	Falsecog			Point
True cognition or true attitude toward cigarettes	Truecog			Point
Actual price of cigarette per pack	Price		Price of cigarette per pack	Baht/pack
Realization the	Realization	1	Know	

enforcement of non smokers' health protection act 1992		0	Don't know	
Education level* (approximates of schooling years) (Isra.1997:159)	Schoolyears	0	No formal education	
		1	Kindergarten	
		2	Elementary grade 1	
		3	Elementary grade 2	
		4	Elementary grade 3	
		5	Elementary grade 4	
		6	Elementary grade 5	
		7	Elementary grade 6	
		8	Elementary grade 7	
		-	Elementary not specified grade	
		8	Secondary grade 1 (revised scheme)	
		8	Secondary grade 1	
		9	Secondary grade 2	
		10	Secondary grade 3 or junior high school	
		11	Secondary grade 4	
		12	Secondary grade 5	
		13	Secondary grade 6 (high school) or vocational training school	
		-	Secondary not specified grade	
		14	University year 1	

		15	University year 2, college of technology or commercial institute diploma	
		16	University year 3	
		17	University year 4	
		18	University year 5	
		19	University year 6	
		17	Bachelor degree	
		19	Higher than bachelor degree	
		15	University not specified level	
		13	Lower vocational	
		15	Upper vocational	
		15	High vocational	
		13	Teacher training	
		14	Technical and advanced vocational	
		-	Other education	
		0	Unknown or not reported	
Sex	Sex	1	Male	
		0	Female	
The amount of smoking years	Smokeyear			Year
Number of work hours per day	Workhours			Hours/day
The quantity cigarette smoking per day	$Y_{2quantity}$			Stick /day
Smoke,non smoke	Y_{3smoke}	1	Smoke	
		0	Non smoke	

Continue to smoke, quit smoking	$Y_{1continue}$	1	Continue to smoke	
		0	Quit smoking	

*Remark: Other education, upper elementary education not specified grade, and upper secondary education not specifies grade are excluded.

Degree of awareness about health hazards due to smoking: A degree of awareness about health hazards due to smoking test consists of 5 questions, each with 4 choices. If a worker chooses a correct answer, he will get 1 point, otherwise will get zero. Each question has only one correct answer so the maximum point is 5. The awareness degree is categorize into 4 levels based on Bloom's principle(Bloom, 1971): (1)great awareness for whose point is over 80% (4-5 points), (2) good awareness for whose point is about 60-79% (3-4 points), (3) fair awareness for whose point is about 40-59% (2-3 points) ,and (4) hardly awareness for whose point is by 39% (0-2 points). In conclusion, the more points he gets, the more awareness degree he has.

Cognition or attitude toward cigarettes (false cognition or false attitude toward cigarettes, true cognition or true attitude toward cigarettes): This part of questionnaire is to evaluate a worker's attitude scale. A series of questions was about attitude toward each subject and provided with interval scale of answers, so the sample group could specify their attitude exactly. This part consists of 3 components: (1) cognitive or belief component to define what his personal cognitive or belief toward the subject is, (2) feeling or evaluating component to evaluate his reaction toward the subject and (3) behavioral component to show his tendency to react toward the subject. It's necessary to analyze these 3 components altogether in order to get a general concept precisely instead of extracting results from one behavior only. Therefore, it's important to know worker's feeling toward the subjects and also his tendency of attitude. Liker's Scale which is one of the most acceptable attitude tests consisted of many questions about attitude or feeling toward something both in positive and negative equally. The test answer is divided into 5 scales: totally agree (5 point), agree (4 point), doubtfully (3 point), disagree (2 point) and totally disagree (1 point). Every worker must answer all questions by choosing the scale that exactly represented his true feeling. A total final result will show his attitude.

APPENDIX IV

CLASSIFICATION OF FACTORIES BY 21 INDUSTRIAL GROUPS

Industrial code1. Basic agro-industry	
Categories	Commercial enterprise (business activities)
1	to cure tea leaves or tobacco
2	agricultural products/crops
3	grains or bulb from plants
Industrial code 2. Food Industry	
Categories	Commercial enterprise (business activities)
4	non – aquatic animals
5	Diary products
6	aquatic animals
7	oil from plants or animals/fat from animals
8	vegetables, plants or fruit
10	food from flour
11	Sugar
12	tea, coffee, coco, chocolate or dessert
13	food ingredients
14	ice making
15	products from animals/animal food
Industrial code 3. Beverage	
Categories	Commercial enterprise (business activities)
16	alcoholic drinks
17	ethyl alcohol
18	making fruit alcoholic drinks/ mixing fruit alcoholic drinks
19	regarding beer or malt
20	regarding drinking water, non-alcoholic drinks (refreshment, pop, mineral water)
Industrial code 4. Textile	
Categories	Commercial enterprise (business activities)
22	spinning, wearing, cleansing, dyeing (tinting)
23	weaved products used for special purposes (which are not clothes)
24	lace or crochet, lace work
25	mat, carpet
26	thread, rope, net, bag-net, cast net (fish net), ring net (purse net)
27	fabric or products which are not made by weaving, knitting
Industrial code 5. Wearing Apparel except shoes	
Categories	Commercial enterprise (business activities)
28	clothes or garments (which are not shoes)
Industrial code 6. Leather products and Food wear	
Categories	Commercial enterprise (business activities)
29	ferment, dissect (cut), roast, bleach or grind; cleanse, polish,

	scrub and embellish, press for relief effect (art) or enamel
30	tress, cleanse, tint, scrub or embellish the fur
31	making carpet or products form animal skin or fur
32	products different from clothes or shoes
33	shoes or shoes' accessories
Industrial code 7. Wood and wood products	
Categories	Commercial enterprise (business activities)
34	wood works
35	utensils or equipment from bamboo, rattan, straw, reed, giant reed or water hyacinth
36	products form wood or cork
Industrial code 8. Furniture and fixture	
Categories	Commercial enterprise (business activities)
37	furniture or fixture and fittings used for decorating the building (made of wood, glass, rubber, plastic or non-metal
Industrial code 9. Paper & paper product	
Categories	Commercial enterprise (business activities)
38	making paper or fiber
39	making vessels or utensils from every kind of paper or from fiber board
40	making things using fiber, paper or carton
Industrial code 10. Printing, publishing, allied products	
Categories	Commercial enterprise (business activities)
41	printing activities, making file holders, book-binding, making book or report's cover or making metal mold
Industrial code 11. Chemical & chemical products	
Categories	Commercial enterprise (business activities)
42	chemical products
43	fertilizer or pesticide
44	resin or synthetic fiber
45	turpentine oil, paint, polishing oil
46	medical supplies
47	soap, toilet articles, cosmetics
48	chemical products
Industrial code 12. Petroleum products	
Categories	Commercial enterprise (business activities)
49	petroleum distillery, petroleum refinery
50	products from petroleum, coal, or lignite
Industrial code 13. Rubber products	
Categories	Commercial enterprise (business activities)
51	to fix or to mould the tyre of the outer tyre, moulding used for vehicles the inner tyre
52	products from rubber
Industrial code 14. Plastic products	
Categories	Commercial enterprise (business activities)
53	plastic products

Industrial code 15. Non – metal products	
Categories	Commercial enterprise (business activities)
54	making glass, glass fiber, or glass ware
55	glazed tiles, pottery, porcelain
56	making brick, tile, or pipe used in construction, making a crucible, making decorating tiles
57	products from cement, limestone or plaster
58	products from non-metal
Industrial code 16. Basic metal products	
Categories	Commercial enterprise (business activities)
59	smelting, molding, forging, producing iron, basic steel
60	smelting, mixing, purifying melting, molding, or producing basic metal which is not iron nor steel
Industrial code 17. Fabricated products	
Categories	Commercial enterprise (business activities)
61	producing, shaping, altering, or fixing tools or equipment made of iron or steel
62	producing, shaping, altering or fixing furniture or architectural or decorations made of metal
63	meal products used for construction or installation
64	regarding metal products
104	producing, composing spare parts or repairing radiator, boiler, steaming pot, boiling pot using liquid or gas as conduction
Industrial code 18. Engine & Mechinery	
Categories	Commercial enterprise (business activities)
65	producing, composing or altering or fixing machines, generators, dynamos and equipment
66	producing, composing, altering or fixing engines used in agricultural activities, farming and equipment
67	whether concerning to machines, spare parts, or equipment for the machines used in producing metal or not
68	producing, composing, altering or repairing engines used in paper industry, chemical industry, food industry, textile industry, cement industry, clay pottery, products used in construction, mining, boring for petroleum
69	producing, composing, altering or fixing computers, cash register, hole puncher machine, digital or analog calculating machine or electronic machine
70	producing, composing, altering or repairing water pumps, air or gas compressor, blower, air-conditioner, fire extinguisher, ventilator refrigerator, washing machine, dry-cleaner, iron, springler
Industrial code 19. Electroncal Machinery and supples	
Categories	Commercial enterprise (business activities)
71	produce, compose, alter or repair engines or products indicated in category 70 especially for electrical equipment, such as, electrical

	machines, dynamos, adaptors, transformer, switch board or electric controller
72	radio set, television set, broadcasting machine or sound recorder, record player, answering machine, tape cassette recorder/player, video tape recorder
73	produce, compose, alter tools or electrical appliance which is not indicated in categories including their spare parts
74	electric appliance ,electric equipment
107	produce compact discs, records, tape cassettes either in form of being recordable, rewritable, or already recorded with information (data CD with closed/stamped session)

Industrial code 20. Transport Equipment

Categories	Commercial enterprise (business activities)
75	regarding boats
76	regarding train, electric tram, suspended cable car
77	regarding cars, trailers
78	regarding motorcycles, tricycles, bicycles
79	regarding aircrafts, hovercrafts
80	produce, compose, alter or repair vehicles which are not bicycles driven by human force, animal force including their spare parts
95	regarding vehicles driven by machines, trailer, tricycle or the spare parts of those vehicles

Industrial code 21. Other Manufacturing industries

Categories	Commercial enterprise (business activities)
3	regarding rocks, stone, pebbles, sand or soil used forcing construction (building material)
21	regarding tobacco or snuff
81	regarding medical equipment or scientific equipment
82	produce tools or equipment used with the eyes , or eye-sight measurement; producing lens, tools or equipment using light as energy for operation or photocopier
83	produce or compose clocks, watches, timers or their spare-parts
84	regarding diamond, gems, gold, silver, alloy of gold and copper, on jewelry
85	produce or compose musical instruments including their spare parts
86	produce or compose sport equipment, exercise equipment, billiards equipment, bowling equipment, fishing equipment including their spare parts
87	games equipment or other tools or equipment not mentioned above (in the categories)
88	produce, transfer, sending out or distribute electricity power
89	produce gasses which are not natural gas or distribute gases
90	provide water, purify water or distribute drinking water to buildings or factories
91	pack goods in containers for storage without manufacturing

92	cold storage
93	repair shoes or leather products
94	repair electric appliance or electric equipment and tools used in the house or personally
96	repair clocks, watches, timer or jewelry made of diamond, gems, gold, platinum, silver, alloy of gold and copper
97	repair the products not indicate in any categories
98	do the laundry, dry cleaning, cleansing, dyeing, making clothes, garments, carpet, rugs, or fur
99	produce, repair, alter or change the components of arms, such as, guns, pistols, explosive, bombs or any thing haring potential to destroy or eradicate things
100	decorate or change the products' features or components without manufacturing
101	improve the quality of the global wastes
Categories	Commercial enterprise (business activities)
102	regarding the production and the distribution of the dry ice (steam)
103	regarding salt
105	selection of trash, garbage, litter or unused thing or unused materials, sorting through the trash including burying the litter (organic trash)
100	recycling the unused or defect industrial products from factories to transform them or reproduce them through the manufacturing processes

APPENDIX V

THE CORRELATION OF FACTORS

Correlations	Age	Smokeyear	Income	Workhours	Schoolyears	Sex	Realization	Awareness
Age	1.000	0.559	0.485	-0.109	-0.011	0.095	0.073	-0.135
Smokeyear	0.559	1.000	0.313	-0.250	0.047	0.081	0.092	-0.031
Income	0.485	0.313	1.000	-0.154	0.303	0.140	0.105	0.030
Workhours	-0.109	-0.250	-0.154	1.000	-0.052	-0.110	-0.208	-0.190
Schoolyears	-0.011	0.047	0.303	-0.052	1.000	0.105	0.083	0.130
Sex	0.095	0.081	0.140	-0.110	0.105	1.000	0.060	0.080
Realization	0.073	0.092	0.105	-0.208	0.083	0.060	1.000	0.110
Awareness	-0.135	-0.031	0.030	-0.190	0.130	0.080	0.110	1.000
Y3smoke	-0.005	.(a)	-0.020	0.096	-0.013	0.435	-0.063	-0.047
Y2quantity	-0.444	0.697	-0.217	0.263	-0.025	0.103	-0.085	-0.041
Price	-0.018	0.012	0.263	0.277	0.082	0.154	-0.019	-0.039
Maxprice	0.071	0.168	0.185	0.079	0.105	0.114	0.025	0.005
Maxpriceratio	0.077	0.169	0.109	0.025	0.088	0.092	0.022	0.009
Maxfine	0.154	0.002	-0.037	-0.051	0.148	0.078	0.181	0.094
Y1continue	-0.062	0.204	-0.139	0.025	-0.169	-0.060	-0.015	-0.114
Truecog	0.075	-0.032	0.024	-0.096	-0.025	-0.063	0.050	0.164
Falsecog	0.171	0.108	-0.009	0.212	-0.078	0.092	-0.072	-0.177

Note: .(a) means cannot be computed because at least one of the variable is constant.

THE CORRELATION OF FACTORS (Continued)

Correlations	Y3smoke	Y2quantity	Price	Maxprice	Maxpriceratio	Maxfine	Y1continue	Truecog	Falsecog
Age	-0.005	0.444	-0.018	0.077	0.046	0.154	0.062	0.075	0.171
Smokeyear	.(a)	0.697	0.012	0.169	0.109	0.002	0.204	-0.032	0.108
Income	-0.020	0.217	0.263	0.109	0.100	-0.037	-0.139	0.024	-0.009
Workhours	0.096	-0.263	0.277	0.025	0.015	-0.051	0.025	-0.096	0.212
Schoolyears	-0.013	-0.025	0.082	0.088	0.067	0.148	-0.169	-0.025	-0.078
Sex	0.435	0.103	0.154	0.092	0.080	0.078	-0.060	-0.063	0.092
Realization	-0.063	0.085	-0.019	0.022	0.011	0.181	0.015	0.050	-0.072
Awareness	-0.047	0.041	-0.039	0.009	0.005	0.094	-0.114	0.164	-0.177
Y3smoke	1.000	.(a)	.(a)	.(a)	.(a)	.(a)	.(a)	-0.177	0.127
Y2quantity	.(a)	1.000	-0.094	0.156	0.059	0.036	0.124	-0.082	0.061
Price	.(a)	0.094	1.000	0.042	0.038	-0.122	0.002	0.020	-0.040
Maxprice	.(a)	0.178	0.275	1.000	0.860	0.118	0.115	0.044	0.039
Maxpriceratio	.(a)	0.156	0.042	0.969	1.000	0.161	0.130	0.039	0.046
Maxfine	.(a)	0.036	-0.122	0.161	0.061	1.000	0.109	0.038	-0.066
Y1continue	.(a)	0.124	-0.002	0.130	0.101	0.109	1.000	-0.036	0.077
Truecog	-0.177	-0.082	0.020	0.039	0.023	0.038	-0.036	1.000	-0.056
Falsecog	0.127	0.061	-0.040	0.046	0.039	-0.066	0.077	-0.056	1.000

Note: .(a) means cannot be computed because at least one of the variable is constant.

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