การศึกษาเปรียบเทียบนโยบายจัดการอุปสงค์การเดินทางในเมืองต่างๆในเอเชียตะวันออกเฉียงใต้: ประสบการณ์ในอดีต ความเป็นไปได้ทางสังคม และการนำไปใช้ในอนาคต

นายเบอเลียน คุสฮารี

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิศวกรรมศาสตรมหาบัณฑิต

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A COMPARATIVE STUDY OF
TRANSPORTATION DEMAND MANAGEMENT POLICIES
IN SOME SOUTHEAST ASIAN CITIES: PAST EXPERIENCES,
SOCIAL FEASIBILITY AND FUTURE PROSPECTS

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นายเบอเลียน คุสฮารี : การศึกษาเปรียบเทียบนโยบายจัดการอุปสงค์การเดินทางในเมืองต่างๆในเอเชียตะวันออกเฉียงใต้: ประสบการณ์ในอดีต ความเป็นไปได้ทางสังคม และการนำไปใช้ในอนาคต. (A COMPARATIVE STUDY OF TRANSPORTATION DEMAND MANAGEMENT POLICIES IN SOME SOUTHEAST ASIAN CITIES: PAST EXPERIENCES, SOCIAL FEASIBILITY, AND FUTURE PROSPECTS) อาจารย์ที่ปรึกษา: อาจารย์ ดร.ศักดิ์สิทธิ์ เฉลิมพงศ์, 136 หน้า. ISBN 974-53-1310-6.

หลายเมืองหลักของประเทศในแทบภูมิภาคเอเชียตะวันออกเฉียงใต้ได้ประสบปัญหาการจราจรติดขัดในโครงข่ายถนนที่นำไปสู่ปัญหาที่ยุ่งยากอื่นๆอีกมากมาย เช่น ปัญหามลพิษทางอากาศ และการเสื่อมโทรมของสิ่งแวดล้อม เสียโอกาสที่มีค่าทางเศรษฐกิจเนื่องจากการใช้เวลาเดินทางเป็นเวลานาน และสภาพจิตใจที่ย่ำแย่ของผู้เดินทางในแต่ละวัน มีหลายการศึกษาที่แสดงให้เห็นว่าสถานภาพของปัญหานี้มีรากฐานมาจากการเติบโตของเมืองที่ไม่ได้สัดส่วนระหว่างด้านอุปสงค์และด้านอุปทานในการขนส่ง ในความเป็นจริงเมื่อไม่นานมานี้มีบางการศึกษาของระบบการขนส่งในเมืองในเมืองแทบเอเชียตะวันออกเฉียงใต้ได้มีการแนะนำให้ใช้การจัดการอุปสงค์การเดินทางในนโยบายการพัฒนาเมือง บางมาตรการถูกแนะนำให้จำกัดการครอบครองและการใช้รถยนต์ส่วนตัว และสนับสนุนให้ใช้ระบบขนส่งสาธารณะเพื่อลดความไม่สมดุลดังกล่าว

จากการศึกษานี้พบว่าในประสบการณ์ที่ผ่านมาของเมืองในประเทศเอเชียตะวันออกเฉียงใต้ 5 เมือง ได้แก่ สิงคโปร์ กรุงเทพมหานคร จาการ์ตา กัวลาลัมเปอร์ และมะนิลา ที่ได้พิจารณาและนำการจัดการอุปสงค์การเดินทางมาใช้ในการวางแผนการขนส่ง โดยเริ่มที่สิงคโปร์ซึ่งเป็นที่ทราบกันดีว่า ประสบความสำเร็จในการบรรเทาปัญหาจราจรติดขัด แต่เมื่อพิจารณาประสบการณ์จากเมืองอื่นๆ พบว่าส่วนมากไม่มีการยอมรับในมาตรการการจัดการอุปสงค์การเดินทางเท่าที่ควร การศึกษานี้จึงทำการตรวจสอบในเชิงลึกถึงปัจจัยต่างๆที่สามารถอธิบายสภาพการยอมรับมาตรการการจัดการอุปสงค์ในเมืองในพื้นที่ศึกษาเหล่านี้ยกเว้นสิงคโปร์ จากการพิจารณาเน้นเฉพาะผู้ใช้รถยนต์ส่วนตัว พบว่าคุณลักษณะทางสังคมและเศรษฐกิจเพียงอย่างเดียวที่ไม่สามารถอธิบายการยอมรับในบางมาตรการในพื้นที่ศึกษาได้อย่างน่าพอใจ สำหรับลักษณะด้านจิตวิทยาหลายประการ พบว่าส่งผลกระทบอย่างมีนัยสำคัญต่อการยอมรับาตรการจัดการอุปสงค์ ลักษณะด้านจิตวิทยาเหล่านี้ ได้แก่ การคล้อยตามสังคม การรับรู้ประสิทธิภาพของมาตรการและความคาดหวังถึงผลลัพธ์ส่วนบุคคล การตระหนักถึงปัญหา และ การให้ความสำคัญต่อความคล่องตัวในการเดินทาง เป็นต้น ดังนั้นในการนำตรการการจัดการอุปสงค์การเดินทางไปปฏิบัติใช้ จำเป็นต้องพิจารณาถึงลักษณะทางจิตวิทยาเหล่านี้อย่างถ้วนถี่ด้วย

ภาควิชาวิศวกรรมโยธา	ลายมือชื่อนิสิต...
สาขาวิชาวิศวกรรมโยธา	
ปีการศึกษา2547	ลายมือชื่ออาจารย์ที่ปรึกษา....................................

4670632821 : MAJOR CIVIL ENGINEERING
KEYWORDS : TRANSPORTATION DEMAND MANAGEMENT / SOUHTEAST ASIAN CITIES / SOCIAL FEASIBILITY

BERLIAN KUSHARI: A COMPARATIVE STUDY OF TRANSPORTATION DEMAND MANAGEMENT POLICIES IN SOME SOUTHEAST ASIAN CITIES: PAST EXPERIENCES, SOCIAL FEASIBILITY, AND FUTURE PROSPECTS. THESIS ADVISOR: SAKSITH CHALERMPONG, Ph.D. 136 pp. ISBN 974-53-1310-6.

Several major Southeast Asian cities are experiencing severe traffic congestion in their road networks that leads into the emergence of many multidimensional problems, such as air pollution and environmental degradation, substantial economic lost due to longer travel time, and psychologically distressing circumstances during daily trips. Many studies pointed out that this situation has a root in the disproportionate growth between the demand side and the supply side of transportation. In fact, some earlier studies of urban transportation system in ASEAN cities had suggested respective authorities to integrate Transportation Demand Management (TDM) into their urban development policies. Some measures were suggested to restrain ownership and use of private cars and to promote public modes of transportation in order to minimize such an imbalance.

This study explores the past experiences of five ASEAN cities, namely Singapore, Bangkok, Jakarta, Kuala Lumpur, and Manila, in considering and implementing TDM in their urban transportation development. It begins with Singapore, which is widely known as a rare example where TDM successfully works in curbing congestion, and then moves to contrast experiences from the other cities. Recognizing the fact that TDM is hardly acceptable to the society, the study subsequently steps further into investigating potential explanatory factors pertaining to social feasibility of some TDM strategies in the study area, except Singapore. Focusing exclusively on car users, the study reveals that acceptability of some TDM measures in the study area could not be explained satisfactorily only on the basis of people’s socioeconomic features. Some qualitative–psychological aspects, such as social norm, perceived effectiveness, and personal outcome expectation, problem awareness, and important mobility aims are found to play significant roles. Consequently, these aspects need to be considered for future TDM program implementations.

Department of Civil Engineering
Field of study Civil Engineering
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Student’s signature……………………...

Advisor’s signature ……………………..

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Chapter I
Introduction

1.1 BACKGROUND

The shape of urban transportation development in many cities, including some Southeast Asian ones, has long been formed through biased policies aimed at providing infrastructures and facilities that accommodate automobile traffic. As long as the assumption that the majority of people use car to travel holds, and thus the objective of urban transportation may be reduced into ‘vehicle mobility’, these devoted-to-car policies may earn justification. However, many unresolved transportation and environmental problems show that these biased policies are incapable to accommodate sustainable development.

Supply-biased and devoted-to-car policies have been criticized for many reasons. As shown by many studies (e.g. Goodwin, 1996; Hansen, 1995; Noland, 2001) traffic tends to increase time to time, filling the additional capacity provided for it. This so-named induced demand phenomenon is thus expected to eradicate almost all of the anticipated benefits from capacity expansion, i.e. reduction of travel delays, and will eventually leave the road network as congested as before.

Opposition to the supply biased policies also has a root in economic rationale. Urban economic studies (e.g. Maddison et. al., 1996 and Litman, 2003a) have long suggested that congestion may be considered a symptom failure to correctly set the market price of a scarce good (i.e. road space) that would bring demand for road space into balance with the supply. On contrary, the costs of utilizing road facility, which is often free or very cheap, normally do not reflect the actual costs the society has to bear. Therefore, road users use road space inefficiently, up to the point where congestion delays limit further use.

Extensive implementation of supply-side policies has also generated serious environmental and social and land use impacts to the society. It is generally acknowledged that motorized modes are generous consumers of non-renewable energy resources; and yet they simultaneously contribute to air quality degradation in urban areas. In social contexts, devoted-to-car policies encourage people to own private vehicle, grow acute automobile dependency, disregard a large part of car travel costs, and look down upon the use of public transportation and non-motorized mode services, which in turn reduce transportation alternatives and make people without a car worse off (after: SUSTRAN, 2004). In addition to these impacts, cars are a major cause of premature death. In Britain, 3,400 people are killed on the roads each year (Banister, 2002), while in ASEAN countries, the 112 people killed everyday by the same cause. All these facts should be sufficiently convincing to undermine the preference for private car and devoted-to-car policies.

In the view of sustainable urban transportation development (Greene and Wegener, 1997), demand management is regarded a vital complementary policy to the traditional approach of merely facilitating the demand by continuously providing and expanding supply infrastructures and facilities. The term Transportation Demand Management (TDM), which was first coined in 1970s, refers to a wide scope policy that essentially aims to make the utilization of transportation resources more efficient (Litman, 2003b). Through its measures and strategies, TDM can reduce traffic volume, promote shifts toward more sustainable modes of transportation, and support for efficient mobility of people and goods, albeit not necessarily mobility of vehicles.

This study presents a comparative analysis of Transportation Demand Management (TDM) policies in five Southeast Asian cities, namely Singapore, Bangkok, Jakarta, Kuala Lumpur and Manila. It explores and contrasts the history and the status of TDM in each city and moves on investigating the issue of social feasibility, i.e. acceptability, for some TDM policies among car users in Bangkok, Jakarta, Kuala Lumpur and Manila.

1.2 PROBLEM STATEMENT

Amid the problems caused by severe traffic congestion, many cities in the region have been evaluating their supply biased polices and considering to control, or at least manage, travel demand through some TDM measures. The common problem faced is the excessive and inefficient use of private vehicles. Manila, for example, has been enforcing the Unified Vehicular Volume Reduction Program (UVVRP), by which it bans roughly 20 percents of its car population to commute the city's road network based on their plate-license number (Magbanua and Villoria, 1999). Jakarta, on the other hand, applies another restraint technique by disallowing the low-occupancy cars to access congested roads (Jakarta Metropolitan Authority, 2003). Other cities, such as Bangkok and Kuala Lumpur, are also keen on promoting public transportation services to reduce private vehicle domination on their roads.

However, as the society is apparently moving toward automobile dependency, it can be hypothesized that the current level of acceptability toward TDM measures is low as TDM seems to disapprove the prevailing attitude by discouraging the use of private cars. As a result, people, especially motorists, oppose the implementation of such measures and be reluctant to change their habits in accordance with the measures. Acceptability is the key of social feasibility and is considered an important precondition to the implementation of any policy in modern democratic society. Therefore, it is important to investigate the factors that can influence the attitude toward TDM policies, which can in turn help devising additional measures to increase acceptability of TDM.

1.3 RESEARCH QUESTIONS

Given the aforementioned background issues and problem statement, the study raises the following research questions:

1. What are the lessons we can learn from Southeast Asian Cities' past experiences in their attempts of implementing TDM?

2. How high is the current acceptability level of various TDM strategies in major Southeast Asian cities?

3. How can the current level of acceptability of TDM strategies be explained?

4. Which factors influence the level of acceptability?

5. How can the acceptability of TDM be increased?

1.4 RESEARCH OBJECTIVES AND SCOPE OF THE STUDY

To address the research questions, the study will be focused on a fourfold objective:

1. Documenting and contrasting the experiences of some Southeast Asian cities in managing travel demand through TDM measures. Cities to be investigated include Bangkok, Jakarta, Kuala Lumpur, Manila, and Singapore.

2. Describing the level of public, i.e. motorists, acceptability and perceived effectiveness toward some packages of TDM generic strategies. Cities to be investigated comprise Bangkok, Jakarta, Kuala Lumpur, and Manila.

3. Investigating the factors that play significant role in influencing public acceptability of several TDM measures in Bangkok, Jakarta, Kuala Lumpur, and Manila. The factors to be investigated comprise, among others, socio-economic and psychological factors.

4. Developing a structural model to frame the issue of acceptability of TDM in Southeast Asian context.

1.5 CHAPTER ORGANIZATION

This report is organized into seven chapters. The first two chapters are introductory sections. The first one provides introduction to this research, including background and motivation behind the study, research questions, research objectives, and report structure. Afterward, the second chapter presents briefly a theoretical review for the concept of Transportation Demand Management (TDM) and the research of acceptability of TDM.

The third chapter is an important part of the report where the methodology adopted throughout this study is discussed. It comprises research framework, questionnaire design, as well as survey design. It also reviews concisely the statistical tools that will be utilized in the subsequent analyses.

The next three chapters constitute the heart of this study, in which the fourfold research objective is elaborated. Chapter four presents a comparative study about the past and the recent status of Transportation Demand Management in some Southeast Asian major cities, comprising Bangkok, Jakarta, Kuala Lumpur, Manila and Singapore. Some lessons are to be drawn from contrasting the experiences of the cities regarding their respective TDM programs. The fifth and sixth chapters explore the issues of acceptability of TDM throughout the study area as defined in the third and fourth research objectives through preliminary data analysis and, subsequently, multivariate statistical analyses.

Lastly, the final chapter summarizes the findings of the research and discusses them further in relation with the future prospects for the implementation of TDM policies in the region.

Chapter II
Literature Review

2.1 INTRODUCTION

This chapter examines the theoretical context of the central issues addressed by this thesis. Firstly, there is a brief discussion about the concept of Transportation Demand Management (TDM). The very nature of traveling, the main idea of TDM in urban transportation, as well as some of its strategies are highlighted. Secondly, the chapter reviews theoretical background for the research of TDM acceptability (especially among the motorists). Thus, the theoretical review addresses the main issues raised in the research questions that were presented in the previous chapter.

2.2 GENERAL CONCEPT OF TRANSPORTATION DEMAND MANAGEMENT

2.2.1 The Nature of Traveling

To develop an effective transportation system, one must call attention to the needs of a traveler. With a through examination of these needs, one could conclude that the real needs are not necessarily mobility, but accessibility in that the purpose of traveling is generally to access goods or a location (Litman, 1999 and 2003c; Barter and Raad, 2000). Mobility is an issue, as the resources expended (i.e. time, fuel, vehicle use, money, etc.) are directly related to ease our choice of movement. The reasons for accessing something do not always require physical movement, as in the case of information, but this represents only a portion of our society's needs, and in most cases, physical movement is required to access one's desire.

This fact calls for an investigation to the various choices of mobility, and the use of these mobility choices in an efficient and coordinated manner. Transportation planners and suppliers must be aware of the balance in transportation supply and demand since people do not always have a keen understanding of the consequences of their demand, which may not be optimal, or 'false', in the light of the whole system. This 'false' demand can push for the supply of more transportation infrastructure, causing negative environmental, economic and land use impacts. Giving in to these 'false' demands will only further a region's spiraling predicament of transportation problems and a 'false' dependency on the automobile (after Lim, 1997).

2.2.2 The Philosophy of TDM

Transportation Demand Management (TDM) is a planning method that tries to reverse the trend and dependency on the automobile by focusing on demand and encouraging a more efficient and environmentally conscious attitude of traveling (Lim, 1997). This is a challenging idea since car has become the dominant mode of urban transportation of the modern society. TDM calls for people to reevaluate their ways of living and how they can accommodate to a less automobile dependent lifestyle. TDM not only promotes such behavior changes, but also assists them through physical infrastructure and programs consciously designed to encourage walking, cycling, transit and higher occupancy traveling. TDM is unusual in that it pushes the realm of transportation planning into a broader context, meshing transportation more tightly into land-use planning and the region's social structure (Lim, 1997; Litman, 2003b; Barter and Raad, 2000).

TDM is not simply a linear, one-dimensional concept, but a very complex and multifaceted philosophy. A serious look at proactive regional transportation planning requires a deeper understanding of not just how people travel, but why. TDM is and should be an investigation of people's lifestyle and behavior in terms of traveling and how they can be changed for the better of society. Therefore, TDM is such a complex subject and should be approached in a sensitive manner.

2.2.3 TDM Strategies

From practical and operational points of view, TDM can be thought of as the planning and implementation of programs that influence the amount, composition, or timing of demand for transportation (British Columbia Transport Financing Authority, 1996, in Lim, 1997). Based on such a definition, many TDM programs can be devised.

A vast collection of TDM strategies is now recognized. Some authors have classified these strategies according to different nomenclatures. Vlek and Michon (1992), for instance, categorize TDM programs into six groups comprising physical changes (e.g. closing out car traffic and providing alternative transportation), law regulation, economic incentives, education, socialization and social modeling targeted at changing social norms, and institutional and organizational changes. A simpler classification is suggested by Steg and Vlek (1997) in which measures fall into two broad groups: those that discourage car use are labeled 'push measures' or 'stick', and those that encourage the use of alternative modes are called 'pull measures' or 'carrot'. A non-exhaustive list of TDM strategies include land use development controls, parking management systems, traffic regulatory controls, automobile restrictions, road and congestion pricing, improvement of public transit and rideshare services, and non-motorized transport promotions.

2.3. THEORETICAL BACKGROUND FOR THE RESEARCH OF ACCEPTABILITY OF TDM

2.3.1 Acceptability as an Attitude

The term *acceptability* is to be distinguished from the term *acceptance* for they refer to different meanings. As suggested by Schade and Schlag (2000), the word acceptability is understood as an affirmative attitude toward a specific object, whereas the acceptance is more related to behavior, as an action or reaction toward the object. In the field of social science, attitude itself is defined as a psychological tendency that is expressed by evaluating a particular entity with some degree of favor and disfavor (Eagly and Chaiken, 1993). As a hypothetical construct, attitude is not directly observable but can be inferred from observable responses. As an attitude, acceptability of TDM strategies is assumed, among other things, to guide people's behavior toward such strategies (e.g. resistance, support, act in accordance with the measures, etc.).

2.3.2 Measuring Acceptability

There are three types of study commonly applied in investigating the acceptability of transportation policies (Rienstra et al., 1999). First, acceptability can be predicted by developing theoretical models that assume rational behavior of individuals. Second, empirical studies can be applied, for example, by setting out questionnaires and interviewing people. Lastly, ex-post studies may be carried out by investigating behavioral changes of individuals due to the measure. In this case, the way the behavior changes may be an indication of acceptance of the measure.

2.3.3 Determinants of Acceptability

Investigations for the factors influencing the acceptability toward transportation policies have been employing heuristic approach in that the relevant determinants and their relationships are first assumed, and then statistical analyses are applied to explain the role of those determinants in influencing the acceptability. Through this approach, many important issues, including psychological and socioeconomic factors, have been identified to play role. Schade and Schlag (2000) and some other authors have reported some potential factors in their reports. These include:

1. Perception of problems

The first issue considered the precondition to acceptability of an urban transportation policy is the level of people's awareness to transportation problems

(Schade and Schlag, 2000; Steg, 2003). Any policy measure directed to overcome transportation problems is likely more acceptable if people perceive the existing problems brought by car use to them and their society as critical. Awareness of problems may hold for two aspects, i.e. personal and societal. On the one hand, it may be assumed that a person who feels that he or she is personally affected by the problems will regard problem-solving measures as necessary to implement. On the other hand, without being affected personally, people may also support for the measures based on evaluating the states as societal or general problems. Greater support for such measures may also be expected if people anticipate worsening future state of the problems. Some studies (e.g. Rienstra et al., 1999) did not simply account for the problems in a general view but rather differentiate them into categories such as safety, environmental, and congestion related problems and look further their correlations with acceptability of specific measures.

2. Important aims to reach

It is plausible to think of many different and conflicting mobility interests pursued by the motorists. However, when it comes to consider public policies, people often not only regard them against their personal interests (i.e. the so-called selfish perspective) but also value the policies in accord with common social aims (i.e. the so-called social perspective). Jaensirisak et al. (2003) provide a review across some fields of social sciences, including psychology, economics and politics, indicating that the people are willing to trade-off between these two perspectives in pursuing their goals in many departments of life. TDM policies can be thought of as in accord with common social aims. Therefore, it can be assumed that higher valuation to reach social aims will lead to increased willingness to accept TDM measures. In contrast, individuals pursuing mainly personal aims are expected to reject the measures because of threatening restrictions to their important personal interests. Empirical evidence about the relevance of 'important aims to reach' issue in the context of road pricing policy is given in, for example, Schade and Schlag (2000), and Jaensirisak et al. (2003).

3. Attribution of responsibility

The complexity of inter-dependent relations and effects in transportation problems may lead people to attribute the responsibility of solving the problems to external entities (e.g. traffic police, municipal authority, public transport companies) and underestimate the participation of internal entity (i.e. themselves) because either they think their contribution is worthless or they do not trust each other to cooperate. However, if people feel personally responsible for the problems and if they are convinced that their own contribution to the solution of these problems is useful, then it may be expected that they are more willing to support TDM measures and to behave in harmony with the measures. Steg and Vlek (1997) have reported the first results of positive correlations between responsibility attribution, problem awareness and acceptability of TDM measures. Similar results were also reported in Schade and Schlag (2003) and Steg (2003).

4. Mobility related social norms

Derived from the theories of reasoned action and planned behavior (Ajzen and Fishbein, 1975; Ajzen, 1991, cited in Eagly and Chaiken, 1993), social norms and perceived behavioral controls are considered important in attitude formation and behavioral engagement. Social norms refer to one's assumption of his or her important others (family, friends, etc.) whether they think he or she should accept, in the context of this research, the introduced TDM measures. If one perceives the social norms as a pressure to his or her behavior, then the more favorable the social norm is with respect to the presented measures, the stronger should be an individual's acceptability of the measures. Schade and Schlag (2003) found an influential positive correlation between social norms and acceptability of pricing strategies. Steg (2003) reported similar results for other TDM strategies.

5. Perceived effectiveness

In evaluating the acceptability of the presented measure, one is assumed to think of its effectiveness to which the aims of the measure can be reached, and perhaps its efficiency, i.e. cost benefit relation compared to the other possible measure. Unfortunately, efficiency criterion has, until recently, not yet examined for its complexity and difficult to investigate or communicate (Schade and Schlag, 2003). Ideally, a more effective measure is more attractive and should be more acceptable for its greater potential in reaching goals. However, many studies suggest that a paradox holds in the case of urban transportation. It is often the case that the most acceptable measure is less effective and the most effective measure is less acceptable (Steg, 2003). For instance, it is widely found that people rate 'public transport improvements' as the most acceptable measure though this is not perceived as the most effective strategy. In addition to this inconsistency, Reinstra et al. (1999) stated that "*strategic responses on perceived effectiveness may occur when respondents try to justify their rejection of painful policy by claiming that they perceive them as ineffective*".

6. Knowledge of options

The influence of knowledge of TDM options on acceptability is rather ambiguous. Some studies indicate that there is a direct influence, and others suggest that the influence is instead mediated through third-order variable (Schade, 2003). Although this causal connection has not been settled yet, previous studies showed that well-known demand management measures received a higher acceptability than unknown measures (Schade and Schlag, 2000). In connection with effectiveness, it may be assumed that higher effectiveness evaluation depends on how well known the measure is, and this effectiveness judgment has an influence to acceptability. However, in contrast to this common assumption, Steg and Vlek (1997) found that knowledge has a negative effect, because higher knowledge leads to a higher assessment of effectiveness but to a significantly lower acceptability of restrictive measures, compared with a less informed control group. Nevertheless, the importance of information in influencing acceptability should not be underestimated, since no innovation can be accepted without appropriate and early information (Schlag and Teubel, 1997).

7. Personal outcome expectation

Acceptability of TDM measures is evidently influenced by how the people perceive the measures as fair enough in distributing costs and benefits (e.g. Jacobsson et al., 2000; Schade and Schlag, 2000; Bamberg et al., 2003). It is recognized that fairness as someone perceives may be not the objective distribution of costs and benefits but still it is psychologically important as a basic requirement for acceptability. Perceived justice in some studies is mediated by personal outcome expectation. It may be assumed that the more people perceive advantages following the introduction of TDM measures the more they will be willing to accept it.

8. Socio-economic features

Acceptability of TDM measures may also be influenced by one’s socioeconomic features. However, not many reasonable assumptions can be made. The most notable one is derived from income level (Rienstra et al., 1999; Jacobsson et al., 2000). According to economic rationale, people with higher income are expected to support price-based TDM strategies because of their lower marginal utility of money and higher marginal utility of time. Conversely, lower support for such strategies is expected from people with lower income level for their higher marginal utility of money and lower marginal utility of time. However, Rienstra et al. (1999) in their analysis upon Netherlands’ data found that the lowest income group perceived pricing measures as most effective, and also, that income level had no significant impact on the support for pricing measures. Schade and Schlag (2000) found that socio-economic features, including income level, sex, household size, occupation status and primary mode of mobility, had a lower influence to acceptability of pricing strategies compared with psychological variables. Low predictive power of socio-economic features to acceptability for the other TDM measures is reflected in a study conducted in Bangkok by Bhattacharjee, et al. (1997).

2.3.4 Structure of Acceptability of TDM

Recognizing some potential determinants of acceptability, recent studies have moved to further explain the underlying structure of acceptability issues. The following section discusses some of the attempts.

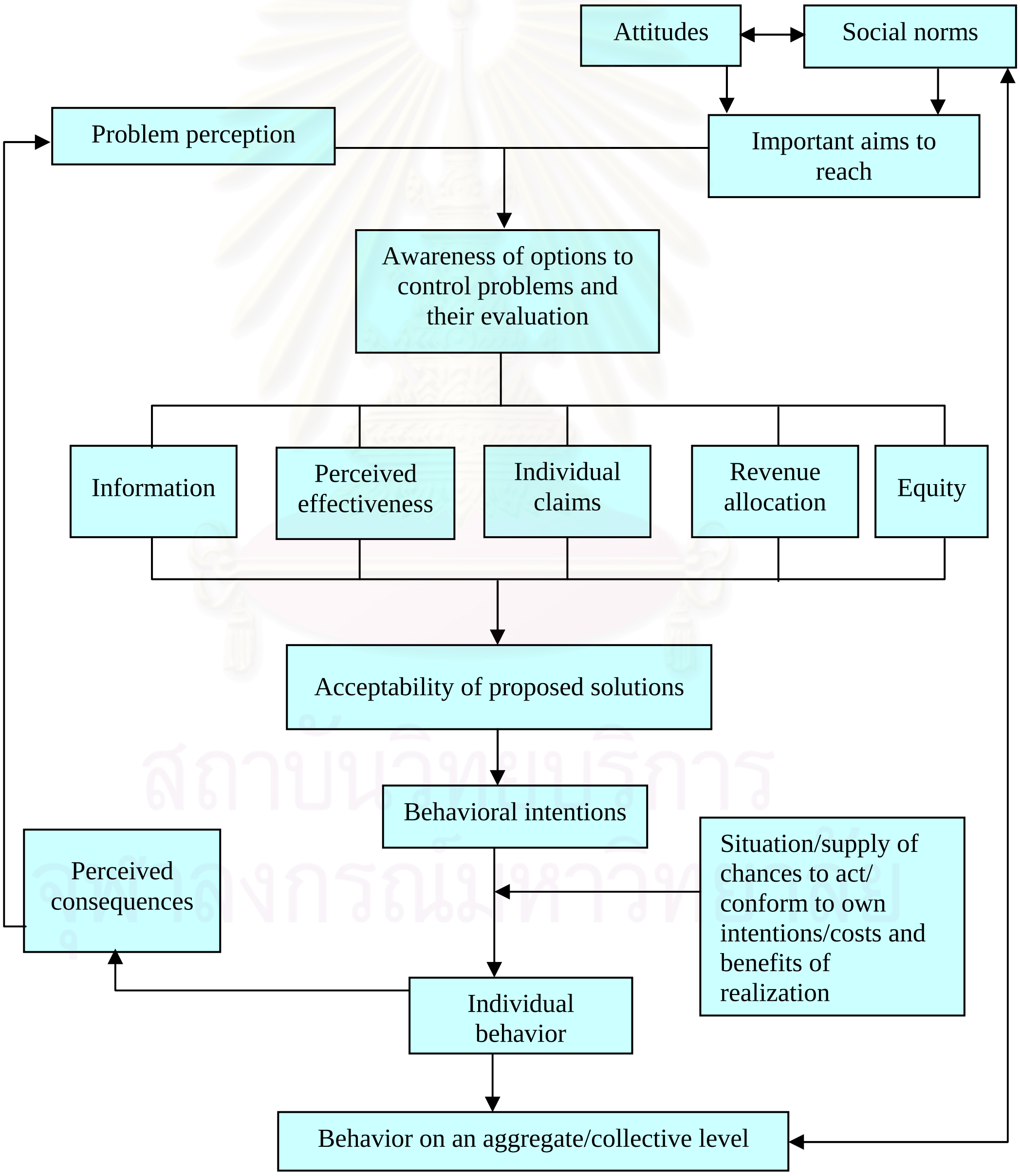


Figure II-1 Structure of acceptability issues. (Source: Schlag and Teubel, 1997)

Realizing that many empirical studies in acceptability toward TDM measures are lacking of a sufficient theoretical basis to describe and explain the phenomena satisfactorily, Schlag and Teubel (1997) have tried to integrate the determinants of acceptability into a heuristic model developed on the basis of Ajzen's theory of planned behavior (Figure II-1). According to the theory, individual behavior can be predicted from his intention to exhibit this behavior. Intention in turn is influenced by three variables: the attitude toward the behavior, the subjective norm and the perceived behavioral control. The latter can also directly influence behavior. In turn, attitude, subjective norm and perceived behavioral control influence one another reciprocally.

Another attempt has been made by Jacobsson *et al.* (2000) who suggested the following causal model (Figure II-2). The model was built in the context of road pricing measures. Using Structural Equation Modeling (SEM) approach, they found an underlying structure behind acceptability as determined directly by fairness and infringement of freedom, and indirectly by income, intentions of car use reduction, and expectation of others' car use. Bamberg and Rolle (2003) subsequently extended Jacobsson's model by incorporating some new explanatory variables and paths (Figure II-3). Their model shows the role of non-car use social norms, problem awareness, and subjective effectiveness in the structure of acceptability. The model was also estimated through SEM approach.

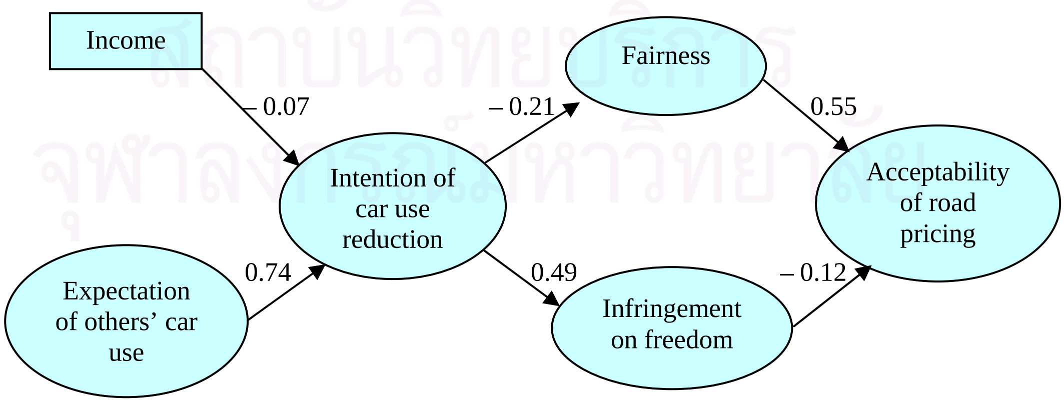


Figure II-2 A causal model for determinants of acceptability of road pricing (Johansson et al., 2000). Path coefficients were estimated by a Structural Equation Model with latent variables.

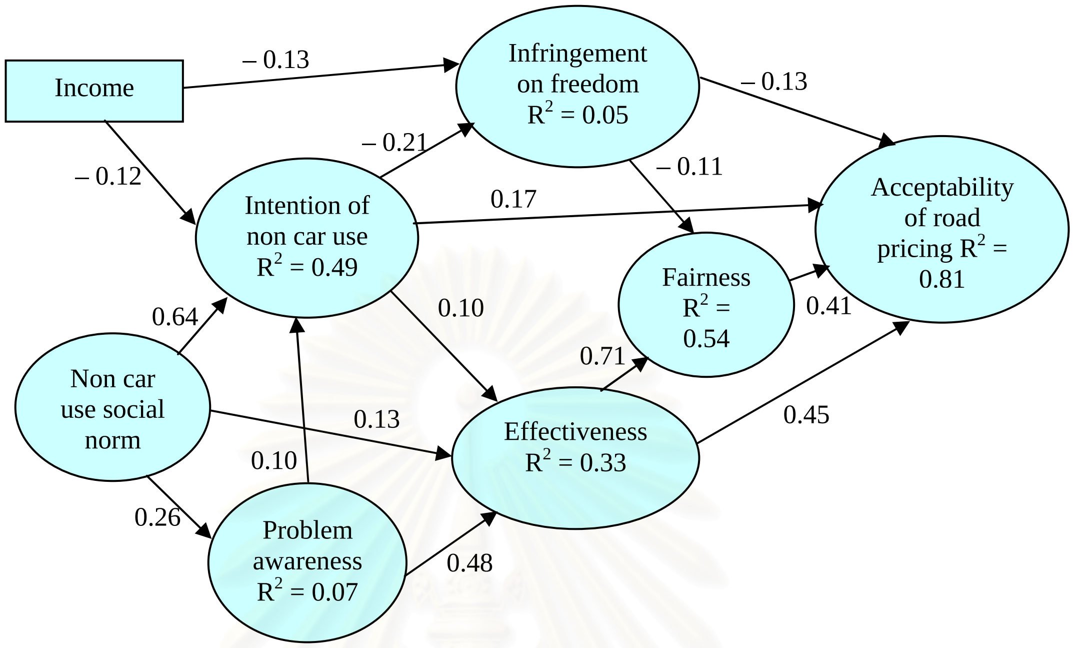


Figure II-3 Extension of Johansson et al.'s model by integrating effectiveness and problem awareness as additional model construct. (Source: Bamberg and Rolle, 2003).

Chapter III
Research Framework

3.1 INTRODUCTION

This chapter discusses the logical framework that forms the basis upon which this research is to be carried out. Firstly, the general methodology is outlined. It then moves on explaining the design of the questionnaire that serves as a means to investigation of acceptability issues. Thirdly, it addresses the steps that will be taken to analyze the raw data from the questionnaire surveys. It also provides a concise review of the statistical tools that will be employed in the subsequent analyses. Finally, it summarizes the plan for conducting field survey, particularly regarding survey subject and sample size.

3.2 RESEARCH METHODOLOGY

In order to accomplish the fourfold objectives outlined in Chapter 1, this study employs the following methodology:

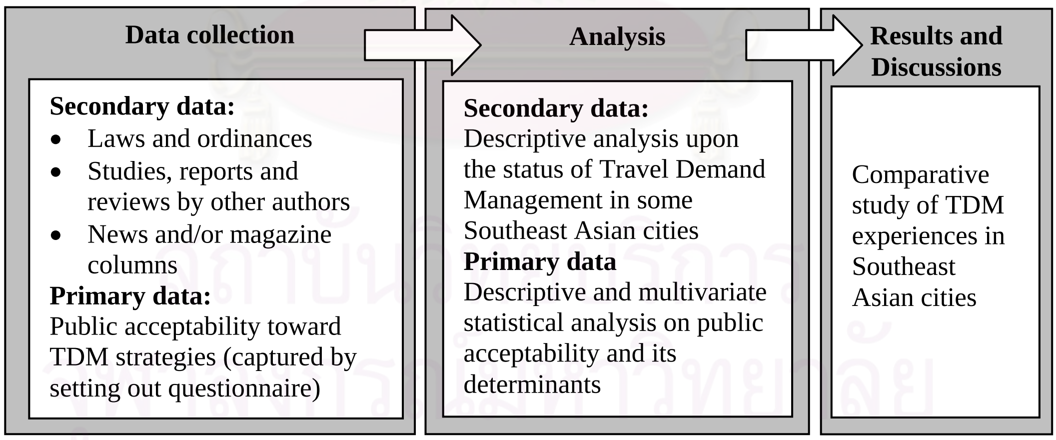


Figure III-1 Research framework

As reflected from the research framework above, the study is generally made up of two parts, i.e. comparative study on TDM experiences and on social feasibility of TDM policies, each of which needs different approaches to deal with. Data collection activities are carried out to gather primary as well as secondary data. In turn, secondary data is mainly used to study the comparative aspects of TDM experiences in the study area, while the primary data forms the basis for acceptability analysis.

The investigation on acceptability issues will take into account several psychological and socioeconomic factors as described in the previous chapter. These factors include problem perception, important aims to reach, attribution of responsibility for resolving transportation problems, mobility related social norms, perceived effectiveness, knowledge or information about the policy, personal expectation outcome, and socioeconomic features, such as gender, age, household income level, education, and auto ownership. Relevant assumptions are made according to the literature and a questionnaire is developed to facilitate the investigation. The study is thus carried out on theoretical and empirical levels, and is not intended as an ex-post study, despite the fact that some TDM programs have been in operation in some cities.

The remaining parts of this chapter will further describe the framework for TDM acceptability analysis, covering questionnaire development, methods of analysis and survey design.

3.3 QUESTIONNAIRE DEVELOPMENT

In dealing with TDM acceptability analysis, it first has to be realized that acceptability and the psychological factors mentioned previously are latent constructs. This implies that measuring them should be conducted via manifest variables that may only partially explain the observed phenomena.

A questionnaire to capture pertinent information regarding public acceptability of TDM measures is developed following that of Schade and Schlag (2000). The structure of the questionnaire is depicted in the following Figure III-2.

Personal and societal problem perception toward the present state of various urban transportation problems and expectation of future state of such problems

Perception of whether traffic volume needs to be reduced

Internal and external attribution of responsibility for resolving transportation problems

Personal and societal important aims to reach

TDM policy package A	**TDM policy package B**	**TDM policy package C**
Knowledge of option	Knowledge of option	Knowledge of option
Perceived effectiveness	Perceived effectiveness	Perceived effectiveness
Acceptability	Acceptability	Acceptability
Expected outcome	Expected outcome	Expected outcome
Social norms	Social norms	Social norms
Behavioral intentions	Behavioral intentions	Behavioral intentions

Public preference for allocation of revenue generated from TDM policy

Personal expectation if internalization of some external costs of driving is imposed

Self-reported demand elasticity of driving for various trip purposes against increased costs of driving

Socio-economic features and mobility patterns

Figure III-2 Structure of the questionnaire.

Essentially, the questionnaire organizes some questions regarding the acceptability of TDM measures and its determinants as discussed in the previous chapter. As noted, many of the variables are qualitative, and thus their measurement is conducted on a qualitative scaling. A five-degree semantic differential scale is chosen for its wide use and popularity in measuring attitudes in contemporary research (Himmelfarb, 1993). In addition, some variables, such as personal and societal problem perception, attribution of responsibility, important aims to reach, behavioral intentions, and expected outcome are measured through a series of manifest variables.

In this research, it is designed that the respondents would evaluate TDM strategies as appear in a package of policy, instead of being introduced as single measures. The reason for this design is the fact that many factors make car use very attractive, and therefore relying on a single measure may not be a useful approach. Various single strategies might supplement or strengthen each other. The combined application of several strategies, linked to a consistent set of policy goals, is likely to be more effective than the use of single strategy, and might be more acceptable (Thrope *et al.*, 2000). Therefore, it would be interesting to let an interviewee evaluate a policy package consisting of several measures at a time.

However, it was difficult to find TDM measures that are currently applied commonly throughout the study area that could serve as a common ground for a comparative analysis. Therefore, some generic TDM measures are selected to form policy packages that would be evaluated by the respondents. Each policy package will adopt the same formula, i.e. consisting of three measures each combining pull and push strategies together.

Table III-1 Packages of TDM policies used in the questionnaire

Name of package	Description
Package *A*	• Improve public transport/transit/rideshare services • Impose zone access control measure on congested areas with the following scheme: From Monday to Friday, 7.00 am to 9.00 am (morning peak) and 4.00 pm to 7.00 pm (evening peak), access to congested areas is granted only for public transportation and private cars with at least three passengers in one car. • Increase the cost of parking in congested areas by 100% increase.
Package *B*	• Improve public transport/transit/rideshare services • Impose zone access control measure on congested areas with the following scheme: Access to congested areas is not granted (prohibited) in Monday for private vehicles with the *last* plate-license number being 0 and 1; in Tuesday for 2 and 3; in Wednesday for 4 and 5; in Thursday for 6 and 7; and in Friday for 8 and 9. In Saturday and Sunday, access for all private cars is granted. • Increase the cost of parking in congested areas by 100% increase.
Package *C*	• Improve public transport/transit/rideshare services • Charge private vehicles a fixed-price charge of US$ 1.00 for accessing congested areas. • Increase the cost of parking in congested areas by 50% increase.

Table III-1 contains the three packages to be evaluated by the respondents. The inclusion of ‘public transport/transit/ride-share service improvements’ in all packages is intended to provide the motorists a way to see an alternative for their car use (i.e. pull measure). It is expected that the motorists would evaluate this option based on their subjective knowledge about such programs in their respective cities. It is to note that such programs are the most acceptable TDM programs rated by the motorists perhaps in every city (e.g. Thorpe et al, 2000;

Bhattacharjee et al, 1997; Steg, 2003) and are the common programs the government in each city emphasizes that it is working on them. The rest two measures are push measures intended to discourage the motorists from using their cars. Physical restraint measures based on a high-occupancy car scenario and on plate license screening scenario are respectively adopted from Jakarta and Manila. Meanwhile, the fixed-charged congestion pricing measure is not yet imposed in the study area despite some plans to implement such a program. The US$1 value corresponds to the value considered by Jakarta in its plan. Lastly, the measure of increasing parking charge is given in percentage to be evaluated locally. Such a program is also hardly applied despite suggestions from some local studies.

The variables captured from the questionnaire for each observation are listed in Table III-2. A sample of the complete questionnaire set is provided in Appendix.

Table III-2 List of variables captured in the questionnaire

No.	Name	Type	Value	Description
1	PPS_1	ordinal	0 to 4	Problem perception on traffic jam from one's social perspective
2	PPS_2	ordinal	0 to 4	Problem perception on inadequate parking spaces from one's social perspective
3	PPS_3	ordinal	0 to 4	Problem perception on inadequate public transportation from one's social perspective
4	PPS_4	ordinal	0 to 4	Problem perception on air pollution from motor vehicles from one's social perspective
5	PPS_5	ordinal	0 to 4	Problem perception on traffic noise from one's social perspective
6	PPS_6	ordinal	0 to 4	Problem perception on unsafe roads from one's social perspective
7	PPP_1	ordinal	0 to 4	Problem perception on traffic jam from one's self perspective
8	PPP_2	ordinal	0 to 4	Problem perception on inadequate parking spaces from one's self perspective
9	PPP_3	ordinal	0 to 4	Problem perception on inadequate public transportation from one's self perspective
10	PPP_4	ordinal	0 to 4	Problem perception on air pollution from motor vehicles from one's self perspective
11	PPP_5	ordinal	0 to 4	Problem perception on traffic noise from one's self perspective
12	PPP_6	ordinal	0 to 4	Problem perception on unsafe roads from one's self perspective
13	PPF_1	ordinal	-2 to 2	State of problem in near future (5 years) for traffic jam
14	PPF_2	ordinal	-2 to 2	State of problem in near future (5 years) for inadequate parking spaces
15	PPF_3	ordinal	-2 to 2	State of problem in near future (5 years) for inadequate public transport
16	PPF_4	ordinal	-2 to 2	State of problem in near future (5 years) for air pollution from motor vehicles
17	PPF_5	ordinal	-2 to 2	State of problem in near future (5 years) for traffic noise
18	PPF_6	ordinal	-2 to 2	State of problem in near future (5 years) for unsafe roads
19	LVT	ordinal	0 to 4	Perception on the need to limit vehicular traffic on the city's road network
20	ATR_1	ordinal	0 to 4	Attribution to the state/central government for resolving transportation problems
21	ATR_2	ordinal	0 to 4	Attribution to municipal authority for resolving transportation problems
22	ATR_3	ordinal	0 to 4	Attribution to the motorists for resolving transportation problems
23	ATR_4	ordinal	0 to 4	Attribution to one's self for resolving transportation problems
24	ATR_5	ordinal	0 to 4	Attribution to engineers for resolving transportation problems
25	ATR_6	ordinal	0 to 4	Attribution to city bus companies for resolving transportation problems

(to be continued)

Table III-2 *(continued)*

No.	Name	Type	Value	Description
26	ATR_7	ordinal	0 to 4	Attribution to taxi companies for resolving transportation problems
27	ATR_8	ordinal	0 to 4	Attribution to traffic/police officers for resolving transportation problems
28	IMAIM_1	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "I want to use my car whenever I like"
29	IMAIM_2	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "The air quality in my city should be better"
30	IMAIM_3	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "I would like to go by car to any place I want"
31	IMAIM_4	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "Traveling within the city should be cheap"
32	IMAIM_5	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "All transport users should be treated equally"
33	IMAIM_6	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "I would like to be by myself if I go by car"
34	IMAIM_7	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "The city center should be more welcome to pedestrians"
35	IMAIM_8	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "There should be more bicycle routes/lines"
36	IMAIM_9	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "Traffic safety should be improved"
37	IMAIM_10	ordinal	0 to 4	The importance of various ideas according to one's personal interest: "I would like to go to any place I want within the city no matter which transport mode I use"
38	INFO_A	ordinal	0 to 4	Level of information previously known about Package A
39	EFF_A	ordinal	0 to 4	Perceived effectiveness of Package A in reducing traffic in the city
40	ACC_A	ordinal	-2 to 2	Level of acceptability for Package A
41	ADV_A	ordinal	-2 to 2	Level of advantages when Package A is imposed
42	SNORM_A	ordinal	-2 to 2	The likelihood of the "important others" to support one's view of accepting Package A
43	INT_A_1	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Drive my car less"
44	INT_A_2	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Use public transport more often"
45	INT_A_3	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Use bicycle/NMT/walk more"
46	INT_A_4	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Join in car-sharing/ride-sharing programs"
47	INT_A_5	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Try to fill extra passengers into my car where the access restriction is imposed"
48	INT_A_6	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Avoid driving the routes where the access restriction is imposed"
49	INT_A_7	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Park inside restriction area and pay parking charge"
50	INT_A_8	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Support a movement to stop the strategy"
51	INT_A_9	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package A is imposed: "Park my car beyond the restricted area and use public transport to travel within that area"
52	INFO_B	ordinal	0 to 4	Level of information previously known about Package B
53	EFF_B	ordinal	0 to 4	Level of (subjective) effectiveness of Pckg. B in reducing traffic in the city
54	ACC_B	ordinal	-2 to 2	Level of acceptability for Package B
55	ADV_B	ordinal	-2 to 2	Level of advantages when Package B is imposed
56	SNORM_B	ordinal	-2 to 2	The likelihood of the "important others" to support one's view of accepting Package B
57	INT_B_1	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Drive my car as usual whenever the access is granted"
58	INT_B_2	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Use public transport more often"
59	INT_B_3	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Use bicycle/NMT/walk more"
60	INT_B_4	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Drive less even during days permitted to drive"

(to be continued)

Table III-2 *(continued)*

No.	Name	Type	Value	Description
61	INT_B_5	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Join in car-sharing/ride-sharing programs"
62	INT_B_6	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Buy second car so I can drive more"
63	INT_B_7	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Park my car as usual (within the restricted area) during the days permitted to drive
64	INT_B_8	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Support a movement to stop the strategy"
65	INT_B_9	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package B is imposed: "Park my car beyond the restricted area and use public transport to travel within that area"
66	INFO_C	ordinal	0 to 4	Level of information previously known about Package C
67	EFF_C	ordinal	0 to 4	Level of effectiveness of Package C in reducing vehicular traffic in the city
68	ACC_C	ordinal	-2 to 2	Level of acceptability for Package C
69	ADV_C	ordinal	-2 to 2	Level of advantages when Package C is imposed
70	SNORM_C	ordinal	-2 to 2	The likelihood of the "important others" to support one's view of accepting Package C
71	INT_C_1	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Drive my car less"
72	INT_C_2	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Use public transport more often"
73	INT_C_3	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Use bicycle/NMT/walk more"
74	INT_C_4	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Join in car-sharing/ride-sharing programs"
75	INT_C_5	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Pay charges and drive/park as usual"
76	INT_C_6	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Support a movement to stop the strategy"
77	INT_C_7	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Ask my office/family to reimburse my expenses on the charges"
78	INT_C_8	ordinal	-2 to 2	The likelihood of a behavior conducted by a motorist when Package C is imposed: "Support a movement to organize office-bus/school-bus"
79	SUP_1	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For supporting municipal budget in general"
80	SUP_2	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For traffic flow improvements"
81	SUP_3	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For reducing public transport fares"
82	SUP_4	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For improving public transport quality"
83	SUP_5	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For lowering income taxes"
84	SUP_6	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For reducing vehicle-ownership taxes"
85	SUP_7	ordinal	-2 to 2	Support on how to spend public money raised from TDM measures: "For improving facilities for pedestrians and cyclists"
86	SUPGOV1	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For supporting municipal budget in general"
87	SUPGOV2	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For traffic flow improvements"
88	SUPGOV3	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For reducing public transport fares"
89	SUPGOV4	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For improving public transport quality"
90	SUPGOV5	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For lowering income taxes"
91	SUPGOV6	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For reducing vehicle-ownership taxes"
92	SUPGOV7	ordinal	-2 to 2	Perception on how the authority will spend public money raised from TDM measures: "For improving facilities for pedestrians and cyclists"
93	EXP_1	ordinal	0 to 4	Things you expect if you must pay more to drive car: "Shorter travel time in city centre"

(to be continued)

Table III-2 *(continued)*

No.	Name	Type	Value	Description
94	EXP_2	ordinal	0 to 4	Things you expect if you must pay more to drive car: "To be strongly affected by the increased costs than most other people"
95	EXP_3	ordinal	0 to 4	Things you expect if you must pay more to drive car: "Less environmental problems in the city"
96	EXP_4	ordinal	0 to 4	Things you expect if you must pay more to drive car: "More efforts to plan my trips"
97	EXP_5	ordinal	0 to 4	Things you expect if you must pay more to drive car: "A nicer city center"
98	EXP_6	ordinal	0 to 4	Things you expect if you must pay more to drive car: "Additional travel costs to my budget"
99	EXP_7	ordinal	0 to 4	Things you expect if you must pay more to drive car: "Unfair restriction to my travel possibilities"
100	EXP_8	ordinal	0 to 4	Things you expect if you must pay more to drive car: "Safer roads for all"
101	EXP_9	ordinal	0 to 4	Things you expect if you must pay more to drive car: "To be unfairly forced to bear the costs of city improvement projects"
102	REDUC	ordinal	-2 to 2	Agreement to the statement reflecting one's personal relationship to his/her car: "It would be so difficult to reduce substantially my trips in the city using my car"
103	EXPENSV	ordinal	0 to 4	Agreement to the trend that driving in the future will become considerably more expensive
104	R_WRK	ordinal	0 to -4	Self reported elasticity for driving to workplace/school when driving becomes more expensive (0: drive as usual, 4: drive substantially less)
105	R_SHP	ordinal	0 to -4	Self reported elasticity for driving for shopping trips when driving becomes more expensive
106	R_SOC	ordinal	0 to -4	Self reported elasticity for driving for leisure/social trips when driving becomes more expensive
107	SEX	nominal	0;1	Gender (0: female; 1:male)
108	EDUC	ordinal	1 to 5	Last education attended (1: primary school or below; 2: secondary school; 3: high school; 4: undergraduate; 5: graduate/doctoral studies
109	AGE	Real	integer	Age
110	EMPLY	nominal	1 to 7	Employment status (1: gov't officials; 2: self employed; 3: work for private agencies/companies; 4: unemployed; 5: student; 6: retirement; 7: other)
111	NHH	Real	integer	No of persons in the household
112	NH18	Real	integer	No of persons in the household younger than 18 years old
113	CAROWN	nominal	0;1	Car ownership (1: own car; 0: otherwise)
114	ORIG	nominal	1;2;3	Place of stay (1: within a city center/CBD; 2: Out of the city center but within the peripheral areas; 3: out of the peripheral areas but within the metropolitan region)
115	DEST	nominal	1;2;3	Place of work/school (1: within a city center/CBD; 2: Out of the city center but within the peripheral areas; 3: out of the peripheral areas but within the metropolitan region)
116	INC	ordinal	1 to 7	Income level (different class intervals for different cities)
117	PRIMOD	nominal	1 to 6	Primary mode to travel daily (1: private car [I drive]; 2: share car with family/friends; 3: school-bus/office-bus; 4: public transport; 5: NMT; 6: walk)

3.4 ANALYTICAL TOOLS

To study the issues of TDM acceptability, four successive steps of analysis are to be carried out on the primary data collected from questionnaire survey. First of all, preliminary analysis will be done using descriptive statistics in order to understand the global characteristics and trends of the data throughout the study area. Secondly, factor analysis will be utilized for purposes: to confirm the theoretical dimensions and scales assumed in some psychometrical variables, such as internal vs. external attribution of responsibility, personal vs. societal mobility aims, etc., and to reduce the amount of data to an appropriate minimum for the subsequent step of analysis.

The third method to be used is multiple regression analysis with ordinal dependent variable. The method is chosen with respect to the ordinal scale used in acceptability measurement. The purpose of this step is to examine the relationships between acceptability and its determinants such that the degree of importance of each explanatory factor can be assessed and compared. Lastly, an attempt will be made to confirm the significance of theoretical underlying constructs that could lead into better explanation of acceptability issues. The structural equation model (SEM) will be used to facilitate the attempt.

A concise review for the statistical methods used in this study is provided in the following sections. The review is based on the work of Washington *et al.* (2003), Greene (2003) and Johnson and Wichern (1992). It includes factor analysis, ordered probability model i.e. ordered probit regression, and structural equation model (SEM).

3.4.1 Factor Analysis

Factor analysis is a method to reduce the number of p variables to a smaller set of parsimonious $K < p$ variables (Johnson and Wichern, 1992). The objective is to describe the covariance among many variables in terms of a few unobservable factors. It is necessary to say that there should be a theoretical rationale for conducting a factor analysis. There should be a theoretically motivated reason to suspect that some variables may be measuring the same underlying phenomenon, with the expectation of examining whether the data support this expected underlying measurement model or process.

Following Washington et al (2003), the factor analysis model is formulated by expressing the X_i terms as linear functions, such that

$$X_1 - \mu_1 = l_{11}F_1 + l_{12}F_2 + \ldots + l_{1m}F_m + \varepsilon_1$$
$$X_2 - \mu_2 = l_{21}F_1 + l_{22}F_2 + \ldots + l_{1m}F_m + \varepsilon_2$$
$$\vdots \qquad \vdots \qquad \ddots \qquad \vdots \tag{3.1}$$
$$X_p - \mu_p = l_{p1}F_1 + l_{p2}F_2 + \ldots + l_{pm}F_m + \varepsilon_p$$

Equation 3.1 can be written in a matrix notation as

$$(\mathbf{X} - \mu)_{px1} = \mathbf{L}_{pxm}\mathbf{F}_{pxm} + \boldsymbol{\varepsilon}_{px1} \tag{3.2}$$

where the F are factors and l_{ij} are the factor loadings. The ε_i are only associated with the X_i. The p random errors and m factor loadings are unobservable or latent. With p equations and $p + m$ unknowns, the unknowns can be directly solved without additional information.

To solve the unknown factor loadings and errors, restrictions are imposed. The types of restrictions determine the type of factor analysis model, orthogonal or oblique. Factor loadings are either close to 0 or close to 1. A factor loading close to 1 suggests that a variable X_i is largely influenced by F_j. In contrast, a factor loading close to 0 suggests that a variable X_i is not substantively influenced by F_j.

The orthogonal factor analysis model satisfies the following conditions (Washington et al, 2003):

F and ε are independent,

$E[\mathbf{F}] = 0$,

$\text{Cov}[F] = \mathbf{I}$, (3.3)

$E[\varepsilon] = 0$, and

$\text{Cov}[\varepsilon] = \nu$, where ν is a diagonal matrix.

To crystallize the relations, factor matrix usually has to be rotated (Johnson and Wichern, 1992). Varimax rotation, which maximizes the sum of the variables of the factor loadings, is a common method for conducting an orthogonal rotation, although there are many other methods.

Interpretation of factor analysis is straightforward. Variables that have high factor loadings are thought to be highly influential in describing the factor, whereas variables with low factor loadings are less influential in describing the factor. Inspection of the variables with high factor loadings on a specific factor is used to uncover structure or commonality among the variables. One must then determine the underlying constructs that are common to variables that load highly on specific factors.

There are some considerations as to deciding how many factors to be extracted. If it has not been specified at the beginning of the analysis, the number of factors to be extracted depends on the eigenvalues of each factor. At first, there are as many factors as variables, but factors are only taken into further consideration if their eigenvalues are at least 1, i.e. if they explain a certain share of the whole variance of all variables. However, trade-off between numbers of factor to be created and logical interpretation of each factor usually applies (after: Johnson and Wichern, 1992).

3.4.2 Ordered Probit Regression

Ordered probability (both probit and logit) regression can be used to model characteristics that are not explicitly observable in the population. It is specifically useful to model an ordered set of outcome where distances between choices are not equal. Assumptions are made on the underlying continuous unobserved variable and thus different boundaries are thereafter determined to recognize discrete nature of the observed dependent variable (after: Greene, 2003). In this study, this transformation capability of the model was utilized to determine the factors that influence the choices process of individuals in the context of TDM. An observed rating for a TDM strategy is an indicator of the unobserved utility distribution.

Formulation of ordered probit model in this section follows that of Washington et al (2003). It is assumed that the unobserved continuous utility distribution of a TDM strategy for the individual is represented as z_i. This unobserved variable z is typically specified as a linear function for each observation, such that

$$z_i = \beta_i \mathbf{X}_i + \varepsilon_i \tag{3.4}$$

where $\mathbf{X}_i$ is a vector of variables determining the discrete ordering for observation i, β_i is a vector of estimable parameters, and ε_i is a random disturbance.

Individual's rating about the strategy observed from a semantic differential or Likert's scale can be represented as y_i {1,2,…J}; where 1 indicates the lowest score and J represents the highest. Using Equation 2.1, the choice of a respondent i, which is represented by an ordinal dependent variable y_i, is related to the unobserved utility measure z_i as (following Washington et al, 2003)

$$\begin{aligned}
y_i &= 1 && \text{if } z_i \le \mu_{i0} \\
y_i &= 2 && \text{if } \mu_{i0} < z_i \le \mu_{i1} \\
y_i &= 3 && \text{if } \mu_{i1} < z_i \le \mu_{i2} \\
y_i &= \ldots && \\
y_i &= J && \text{if } z_i \ge \mu_{i(J-2)}
\end{aligned} \tag{3.5}$$

where the μ_i are estimable parameters, referred to as *thresholds* or *ancillary parameters*, that define y_i, which corresponds to the integer ordering. During estimation, non-numerical ordering such as strongly disagree, disagree, neutral, agree, strongly agree are converted to integers, for instance, 1, 2, 3, 4, and 5 without loss of generality.

For all observations, the μ are parameters that are estimated jointly with the model parameters β. The estimation problem then becomes one of determining the probability of J specific ordered responses for each observation i. This determination is accomplished by making an assumption on the distribution of ε. In the case where ε is assumed to be logistically distributed with zero mean and unit variance *ordered logit model* thus results. On the other hand, if for example ε is assumed to be normally distributed across observations with mean = 0 and variance = 1, and *ordered probit model* results.

In the context of ordered probit models, ordered selection probabilities are as follows (Washington et al, 2003):

$$
\begin{aligned}
P(y = 1) &= \Phi(-\beta\mathbf{X}) \\
P(y = 2) &= \Phi(\mu_1 - \beta\mathbf{X}) - \Phi(\beta\mathbf{X}) \\
P(y = 3) &= \Phi(\mu_2 - \beta\mathbf{X}) - \Phi(\mu_1 - \beta\mathbf{X}) \\
&\;\;\ldots \\
P(y = J) &= 1 - \Phi(\mu_{(J-2)} - \beta\mathbf{X})
\end{aligned} \tag{3.6}
$$

where Φ(.) is the cumulative standard normal distribution,

$$\Phi(\mu) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\mu} EXP\left[-\frac{1}{2}w^2\right]dw \tag{3.7}$$

It is to be noted that in Equation (3.6), threshold μ_0 is set equal to zero without loss of generality. This implies that one needs only to estimate *J – 2* thresholds.

For estimation purpose, Equation (3.6) can be written as

$$P(y = j) = \Phi(\mu_j - \beta\mathbf{X}) - \Phi(\mu_{j+1} - \beta\mathbf{X}) \tag{3.8}$$

where μ_j and μ_{j+1} are upper and lower thresholds for outcome *j*. The likelihood function over *N* observations is given by

$$L(y|\beta,\mu) = \prod_{i=1}^{N}\prod_{j=1}^{J}\left[\Phi(\mu_j - \beta X_i) - \Phi(\mu_{j+1} - \beta X_i)\right]^{\delta_{ij}} \tag{3.9}$$

where δ_{ij} is equal to 1 if the observed discrete outcome for observation *i* is *j*, and zero otherwise. Equation (3.9) leads to a log-likelihood of

$$LL = \sum_{i=1}^{N}\sum_{j=1}^{J}\delta_{ij} LN\left[\Phi(\mu_j - \beta X_i) - \Phi(\mu_{j+1} - \beta X_i)\right] \tag{3.10}$$

In evaluating the effect of individual estimated parameters in ordered probability models, a positive value of β_k implies that an increase in $\boldsymbol{x}_k$ will definitely increase the probability that the highest ordered discrete category results and decrease the probability that the lowest category results. However, the interpretation is not that clear for the *interior* categories. This is because the areas between the shifted thresholds may yield increasing g or decreasing probabilities after shifts to the left or right.

To obtain a sense of the direction of the effects on the interior categories, marginal effects are computed for each category. These marginal effects provide the direction of the probability for each category as

$$P(y = j)/\delta\mathbf{X} = [\phi(\mu_{j-1} - \beta\mathbf{X}) - \phi(\mu_j - \beta\mathbf{X})]\beta \qquad (3.11)$$

where $\phi(.)$ is the standard normal density.

3.4.3 Structural Equation Model (SEM)

Structural equation model (SEM) is a statistical modeling technique designed to deal with several difficult modeling challenges, including cases in which some variables of interests are unobservable or latent and are measured using one or more exogenous variables, endogeneity among variables, and complex underlying social phenomena (after: Washington et al, 2003).

Similar to other statistical models, SEMs are used to evaluate theories or hypotheses using empirical data. The empirical data are contained in a p x p variance-covariance matrix **S**, which is an unstructured estimator of the population variance-covariance matrix Σ. A SEM is then hypothesized to be a function Q, a vector of unknown structural parameters θ, which will generate a model-implied variance-covariance matrix $\Sigma(\theta)$.

All variables in the model, whether observed or latent, are classified as either independent (endogenous) or dependent (exogenous). A dependent variable in a SEM diagram is a variable that has a one-way arrow pointing to it.

Formulation of SEM in this section follows that of Washington et al (2003). The set of these variables is collected into a vector η, while independent variables are stored in the vector ξ, such that

$$\eta = \beta\eta + \gamma\xi + \varepsilon \tag{3.12}$$

where β and γ are estimated vectors that contain regression parameters for the dependent and independent variables, respectively, and ε is a vector regression of disturbances. The exogenous factor covariance matrix is represented as $\Phi = COV[\varepsilon, \varepsilon^T]$, and the error covariance matrix as $\mathbf{Y} = COV[\varepsilon, \varepsilon^T]$.

The variance-covariance matrix for the model in Equation (3.12) is

$$\Sigma(\vartheta) = \mathbf{G}(\mathbf{I} - \beta)^{-1} \gamma \, \Phi\gamma^{T}(\mathbf{I} - \beta)^{-1T}\mathbf{G}^{T} \tag{3.13}$$

where $\mathbf{G}$ is a selection matrix containing either 0 or 1 to select the observed variables from all the dependent variables in η. There are p^2 elements or simultaneous equations in Equation (3.13), one for each element in $\Sigma(\theta)$. Some of the p^2 equations are redundant, however, leaving

$$p^* = \frac{p(p-1)}{2}$$

independent equations. These p^* independent equations are used to solve for unknown parameters θ, which consist of the vector β, the vector γ, and Φ. The estimated model-implied variance-covariance matrix is then given as $\Sigma(\theta)$.

SEM’s parameters are estimated using a discrepancy function criterion, where the differences between the sample variance-covariance matrix and the model-implied covariance-matrix are minimized. The discrepancy function is

$$F = F\left(\mathrm{S}, \sum\left(\hat{\theta}\right)\right) \tag{3.14}$$

Different estimation methods in SEM have varying distributional assumptions and, in turn, require different discrepancy functions. There are several discrepancy functions and their corresponding estimation methods that have been implemented in many SEM computer programs. These include maximum likelihood (MLE), generalized least square (GLS), asymptotically distribution-free (ADF), scale-free least square (SLS), and unweighted least square (ULS). The maximum likelihood discrepancy function, for instance, takes form as (McCallum et al, 1996)

$$F_{MLE} = LN|\Sigma(\theta)| - LN|\mathbf{S}| + \mathrm{TRACE}[\Sigma(\theta)^{-1}\mathbf{S}] - p \tag{3.15}$$

There are some classes of Goodness-of-Fit (GOF) measures in SEM. Some authors (Hair et al, 1998) classify them into three classes: absolute fit measures (e.g. χ^2, root mean square error approximation), incremental fit measures (e.g. normed-fit index, adjusted goodness-of-fit index), and parsimonious fit measures (e.g. Akaike Information Criterion, parsimonious GFI). Absolute fit measures assess the overall GOF for both, the structural and measurement models. Incremental fit measures evaluate a model's GOF as compared to a specified null model to determine the degree of improvement gained from estimating the model. Whereas parsimonious fit indices measure the degree of model fit per estimated coefficient as an attempt to correct for any 'overfitting' and as an evaluation of the parsimony of the model compared to the goodness-of-fit.

3.5 SURVEY DESIGN

3.5.1 Subject of the Survey

Complexity and interconnectedness in general decision-making process is imaginable when it comes to implementing potential demand management policies. As a part of policy, TDM strategies have to satisfy a number of key groups before they can be adopted. These key groups include the motorists as the public affected by the measure, the politicians as the key decision makers, the business community, and the authority. However, this research focuses only on public acceptability, and thus motorist is set as the subject. In the context of the study, motorists are defined as those who commute using private car within the city's road network.

3.5.2 Number of Observations

In this research, factor analysis method will be repeatedly employed prior to regression analysis. The nature of factor analysis that seeks to identify several underlying factors from a set of manifest variables based on their covariance structures needs a reasonably large sample size. Therefore, it is sensible to determine the sample size for this research with respect to the requirements imposed by factor analysis method. For this purpose, the framework suggested by McCallum, Browne, and Sugawara (1996) for determination of sample size in the context of Covariance Structure Models (CSM) is followed.

Within CSM class of models (factor analysis, path analysis, structural equation model, etc.), a discrepancy function is used to estimate model parameters, by which the differences between the sample variance-covariance matrix and the model variance-covariance matrix are minimized. This, in turn, can be used as one of the criteria for assessing model's goodness of fit.

Under the notions of minimizing a given discrepancy function, McCallum, Browne, and Sugawara (1996) have developed two tests in which they introduced the *close-fit* and *not close-fit* null hypotheses that are useful to calculate required sample size, N, and to evaluate model's power, π, to detect the departure from null hypothesis provided the information about model's degree of freedom df, significance level α, assumed Root Mean Square Error Approximation (RMSEA), ε_a, and population RMSEA ε_0 are made available.

The following table (Table III-3) shows the specification for factor models to be estimated with factor analysis. To calculate the required sample size, both close-fit and not close-fit hypothesis tests are applied to the model with lowest degrees of freedom, i.e. 13. Power goal and significance level are set to be 0.80 and 0.05, respectively. For close-fit hypothesis test, values of 0.08 and 0.05 are assigned for ε_0 and ε_a, respectively. As for the not close-fit test, ε_0 = 0.05 and ε_a =

0.01 are used. The null hypotheses for the close-fit test and non close fit-test are H_0: $\varepsilon_0 \leq 0.05$ and H_0: $\varepsilon_0 \geq 0.05$, respectively (based on McCallum *et al.*, 1996).

Table III-3 Factor model specifications for sample size calculation

No	Psychometrical Variables (Name of factor model)	Assumed dimensions (no of meaningful factor, *m*)	No of manifest variables, *p*	Degrees of freedom, *df**
1.	Attribution of responsibility	(1) internal attribution (2) external attribution	8	13
2.	Important aims to reach	(1) personal aims (2) social aims	10	26
3.	Behavioral intentions for package *A*	(1) adapter (reduce driving) (2) opponent (keep driving)	9	19
4.	Behavioral intentions for package *B*	(1) adapter (reduce driving) (2) opponent (keep driving)	9	19
5.	Behavioral intentions for package *C*	(1) adapter (reduce driving) (2) opponent (keep driving)	8	13
6.	Expected outcome	(1) benefited (2) disadvantaged	9	19

*A factor model with *p* manifest variables and *m* factors produces a chi-square statistic with degrees of freedom, $df = [(p - m)^2 - (p + m)]/2$

The results of sample size calculation based on the model with the lowest degrees of freedom for the two hypothesis tests are summarized in the following figures (Figure III-3 and III-4). Calculations were performed using computer program STATISTICA 6.0 (StatSoft Inc., 2001).

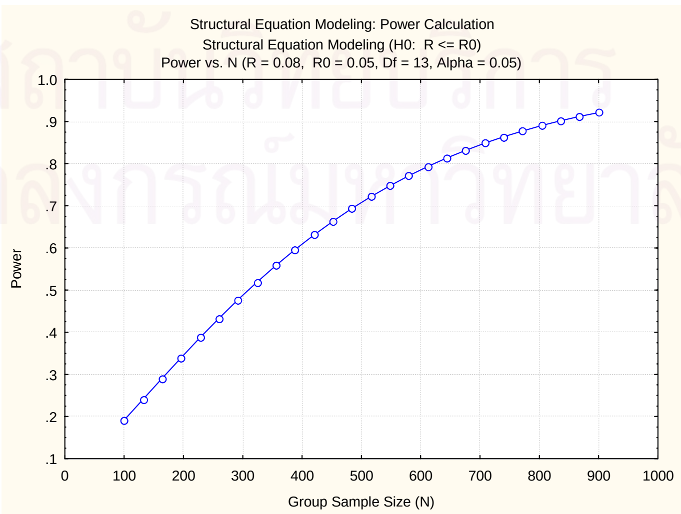


Figure III-3 Sample size vs. Power based on close-fit test

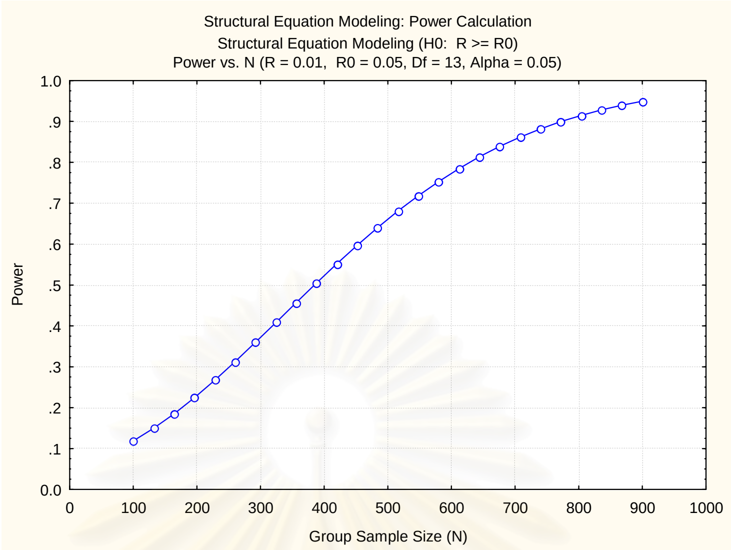


Figure III-4 Sample size vs. Power based on not close-fit test

From the above figures, a sample of 650 observations is deemed sufficient to maintain a reasonably high power of analysis ($\pi > 0.80$) for the factor model with the lowest degrees of freedom, and consequently for the other factor models with higher degrees of freedom, to be estimated. Considering that the investigation would be carried out in four cities, i.e. Bangkok, Jakarta, Kuala Lumpur and Manila, it is reasonable to evenly distribute this amount to 170 observations in each city.

Chapter IV
The Status of Transportation Demand Management in Some Southeast Asian Cities: A Comparative Analysis

4.1 INTRODUCTION

This chapter provides the background information to answer research question number one, i.e. what are the lessons that we can learn from Southeast Asian Cities' past experiences in their attempts of implementing TDM. It first examines the historical perspective about the policy choices taken by the cities during their early era of motorization that help to form their present urban transportation characteristics. Subsequently, there is an exposition about experiences and the status of TDM in each city. Lastly, those experiences are contrasted so that some lessons could be drawn. The cities in this chapter refer to Singapore, Bangkok, Jakarta, Kuala Lumpur, and Manila.

4.2 REACTION TOWARD PRIVATE MOTORIZATION AND ITS CONSEQUENCES

As a result of planning policies that encouraged the use of car, the beginning of an expansion toward mass car and motorcycle ownership could be seen in major ASEAN cities, including Singapore, Kuala Lumpur, Bangkok, Manila and Jakarta, as early as 1970. By 1970, Bangkok, Singapore and Kuala Lumpur each had more than 50 cars per 1000 people. With high population density, those cities found that the influx of vehicles quickly caused problems. Already by that time, congestion was a serious problem in Bangkok and Manila, as the number of vehicles grew. (after: Barter et.al., 2000).

Southeast Asian cities reacted differently toward the increasing vehicle ownership. A few of them resisted, while many of them welcomed. Singapore is a noticeable example of a city that has been consistently resisting car ownership invasion by taking vigorous actions in discouraging private vehicles and encouraging the alternatives through TDM policy. Being a small city-state with limited land supply, this policy is an obvious choice in managing their impending transportation problems. As a result, the city managed to overcome the domination of private cars and has been able to maintain a sustainable transportation and environment.

In other major cities in the region, such as Kuala Lumpur and Bangkok, the opposite situation takes place. Vehicle ownership has been allowed to rise quickly and, in parallel with that, the cities try to cope with it through road building and other reactive measures. Unfortunately, these responses have little impact on improving traffic situations, urban environment, and viability of public transportation in these cities. Furthermore, the passivity eventually allows for a formation of positive attitude toward car ownership among the people. This attitude may be inferred from the fact that car is often the second largest single item of household expenditure after the home, treated with respect and care, and considered the powerful symbol of status and wealth. The users will generally regard car as the most desirable mode of transportation in the city and will normally be used, no matter how attractive the alternatives might be. They may always find a reason why the car is necessary for a particular trip.

4.3 TDM IN SOME SOUTHEAST ASIAN CITIES: PAST EXPERIENCES AND RECENT STATUS

4.3.1 Singapore

Singapore, a 682.3 km2 city-state with 4.13 million people (in 2001) and located at the south of Malaysian Peninsula, is often cited in the literature as the flagship example of a modern city which successfully implements integrated urban transport development policies. Among the key indicators of this accomplishment are (after Dakhal, 2003): relatively high average speed during rush hours on its city roads and expressways, good balance of modal split journey, and acceptable proportion of land use dedicated to road network. In addition to these indicators, Singapore could still maintain a strong economic growth as well as low-level environmental degradation.

According to Menon (2002), Singapore's success is attributed to the implementation of a series of strategic policy instruments. These instruments include (1) land use and transportation planning that minimizes people's need for travel, and thus maximizing road space, (2) an integrated network of roads and expressways, (3) traffic management including the application of Intelligent Transportation Systems (ITS), (4) efficient public transport systems integrating rail, bus, and taxis, and (5) Transportation Demand Management (TDM).

The acknowledgement of TDM in Singapore's transport planning policy indeed was not new. Since its independence three decades ago, policy makers in Singapore have been serious about integrating urban, land-use and transportation planning. Fwa (2002) in Dakhal (2003) stated that an integrated plan was commissioned and completed in 1971, with support from the United Nations Development Programme (UNDP), with the main motivation to achieve strong economic growth as a prominent manufacturing, commercial and trading center.

The major strategies of managing travel demand in Singapore have been reported by many authors, such as Sock et.al. (1996), Seik (1997, 2000a, 2000b), Menon (2002), Dakhal (2003), Goh (2002), and Ibrahim (2003). The strategies comprise:

- Fiscal measures of car restraining including import duty, goods and services tax, registration fee and Additional Registration Fee (ARF)
- Vehicle Quota System (VQS)
- Area Licensing System (ALS) which is lately upgraded to Electronic Road Pricing (ERP) system, and

- Efficient and affordable rail-based (i.e. Mass Rapid Transit and Light Rail Transit) public transportation systems.

The aforementioned strategies could work effectively for Singapore mainly because of the synergetic effects from the government's policy and the characteristics of the society (Dakhal, 2003). Singapore has a strong legislative and institutional framework, low opposition from the society, which is characterized as an economic migrant society, and other localized favorable conditions that made possible for the authority to control the flow of goods and services in and out of the city-state. Singapore's integrated policy indeed results in fairness, convenience for users and regulators, reliability and effectiveness, and achievable strong impact and goals (win-win solutions). However, because of the uniqueness of its domestic factors, some commentators (e.g. Cracknell, 2000 and Breithaupt, 2003) doubt that Singapore's solutions would be directly transferable to other places.

Nevertheless, important lessons may be drawn regarding to some prerequisites for TDM measures to work in Singapore's experience. These prerequisites include (after: Menon, 2002):

- Let the public knows that TDM is as an integral part of an overall transport strategy that include other components such as building of roads, sophisticated traffic management, priority for bus movement, and new rail system.

- TDM makes it expensive to own cars; therefore, there should be acceptable alternatives through a reliable public transport system. In Singapore case, for those who want to drive but are unwilling to pay the ERP, a park-and-ride scheme is available to make them possible to drive to outlying car parks where they could park their cars and conveniently take the train to the city.

- TDM should be applied fairly to everyone without any preferential treatments, except for emergency vehicles. Moreover, TDM measures are configured to make people easy to understand. The authority should also put efforts to keep the measures reliable, especially when high technology is implemented, while convincing people that they will not be penalized because of any equipment malfunction.

- TDM measures are explained as traffic management measures, not revenue generating activities. There should be a willingness to adjust the schemes based on feedback from the public. In Singapore case, ERP charges are adjusted every three months with reference to the prevailing traffic speed, and are reduced when speed improved.

4.3.2 Bangkok

Bangkok Metropolis is inhabited by approximately 6 million people in 2001 with population density of 3,658 people per square kilometer. Bangkok's urban transportation is mainly dependent on road network. The role of water-based transportation that was famous in the past has been largely diminished. The demand for travel in Bangkok has been left uncontrolled since long time. This has led to rapid escalation in vehicle growth rate. According to Tanaboriboon (1992), in 1990 there were 2.3 million registered vehicles in the city. Ten years latter, this figure jumped to 4.5 million.

There hardly found a concrete car restraint measure in Bangkok. However, the suggestion for implementing and integrating such a measure in urban transportation development is indeed not new. The first study that urged the implementation of restraint policy to car ownership and use was done in 1975, i.e. The Greater Bangkok Area Transportation Study. Again, in early 1978 the Bangkok Traffic Management Project recommended some TDM measures to discourage low-occupancy vehicle use including road-pricing, parking controls and staggered work hours. In 1985, once again a traffic restraint measure called Traffic Improvement Program (TRIP) was recommended in order to reduce congestion in the inner city area and to set up a self-financing program by charging toll fees. All these restraint measures, however, had been strongly opposed by the public, and thus had been largely abandoned.

On the other side, Bangkok is serious in improving public transportation sector. Bus transit has been one of the major modes of transportation for years. To improve bus services, an effort has been taken in 1980 to implement bus priority lines. The effectiveness of this program, unfortunately, has faded as other vehicles intruded more and more on to the bus lanes. Besides the bus transit system, recently two rail based transit systems have been introduced. These include the Skytrain and Subway services.

4.3.3 Jakarta

Jakarta, the capital of Indonesia, occupies an area of 650 square kilometers and inhabited by 11 million people in year 2000. It is estimated that by 2015 this population will grow up to 17.3 million (UNESCAP, 2001). Jakarta's urban transportation is mainly dependent on road network. Although rail-based public transportation is present, it only contributes for 1.5 per cent of all trips using public transport (Soemodihardo, 1995). Jakarta is experiencing rapid growth of motorized trip with more than a half modal share goes to public transportation (Soemodihardo, 1995). For the time being, growth in number of vehicle has exceeded the development of road network. Non-motorized trip, however, still operates significantly by means of cycling and walking (Menckhoff, 2001), especially in suburban areas.

As seen in the other metropolitan areas around the region, heavy traffic jam and low air quality also become serious problems faced in Jakarta. As reflected in Jakarta Strategic Plan 2002-2007, until recently the policy of urban transportation still gives priority on building more roads and bridges, improving traffic management to support vehicle movement, and expanding the role of public transport (Jakarta Metropolitan Authority, 2002). A notable study sponsored by Office of Planning and Development in 1998 has suggested urgency of implementing TDM measures. In the newest 2003 Municipal Act concerning with urban transportation, the importance of TDM is now fully recognized and some measures are clearly stated as a part of policies to be implemented. This fact shows that TDM has been accepted politically, although only conceptually. However, concrete plans of realization and integration of TDM in transportation planning and policy is still in absence.

Nevertheless, as a part of traffic management scenario, a high-occupancy vehicle scheme has been applied for private cars at selected city streets at certain time, and will be extended to some other areas. Under this scheme, only private cars with more than three passengers are allowed to access the facility. Despite years of implementation, there is no regular monitoring program to evaluate measure’s performance. Realization of this scheme is not without problems and needs a high effort of enforcement as well. During the last economic crisis, low-income society in Jakarta saw this measure as a means of generating income.

Recently, the authority launched the Transjakarta busway project connecting the most congested road segments in downtown Jakarta. In its planning, the project is anticipated to be expanded to several corridors and complemented with feeder services. The idea is to attract middle-class society to shift from cars to public transport service and to lessen traffic congestion. The concept was firstly initiated in early 2002 by the metropolitan authority and planned to implement by the end of the year. However, realizing premature concepts of implementation, many parties including the Ministry of Communications and non-governmental organizations urged the metropolitan authority to postpone their plan until a substantial improvement is made (Sumabrata J. et. al., 2003). At that time, it was seen that regulations and operational concepts, such as ticketing and marketing system, as well as the strategy to overcome the impact of decreasing number of lanes caused by bus lane assignment were not well prepared. The decision to put the project into operation was finally taken after two-year postponement.

The most recent attempt to relieve traffic congestion is through increasing on-street parking charge up to 200% (Patnisik, 2005a). However, this idea has been immediately dismissed in a consultation with the local House of

Representative. The reasons for the dismissal were that off-street parking facilities were still inadequate and fear of financial mismanagement (Patnisik, 2005b).

4.3.4 Kuala Lumpur

The Kuala Lumpur Metropolitan Area (KLMA) is defined as the areas encompassing five administrative districts of the Klang Valley and the Multimedia Supercorridor (MSC). In 1997, the total population of the area in 1997 was 3.8 million people. This number is expected to increase to 6.9 million in the year 2020 (after: Zakaria, 2003). Population in Kuala Lumpur city is characterized as increasing but at decreasing rates. Contribution of immigration to population is shrinking, and household size is declining. On the other hand, there is a rising emigration trend due to shortage of affordable housing (after: MTRG, 2003).

Kuala Lumpur features a very low residential density compared with other Asian cities (UNESCAP, 2001). MTRG (2003) reports there are some relocation of Government offices to the suburban areas, as well as establishment of suburban shopping centers and business parks; while development of residential areas are more segregated. Very rapid urban decentralization of land uses, especially residential development, drives travel demand dramatically.

Kuala Lumpur is an auto-dependent city with low modal share for public transport. According to a study by Japan International Cooperation Agency (JICA) in 1998, 56% of the daily trips in Kuala Lumpur were made on private modes. In year 2000, Office of Road Transportation reported that there were 985.7 cars and motorcycle for every 1000 people (Kuala Lumpur City Hall, 2000). In contrast to the growth of car-based trip demand, expansion of roads is low and constrained by limited space in inner areas. UNESCAP (2001) reviews that the strong fleet growth as compared to low road network expansion has resulted a significant rising of vehicle-density (vehicle per road-kilometer) in Malaysia. In addition, Malaysia government has a strong commitment to support national car policy. It was reported that sales of the first national car, the Proton Saga, has strongly boosted car ownership levels. More over, due to the strong demand, a second national car project has been implemented with all the active involvements of the private sector. In the first year of production, it was anticipated that the second car plant would manufacture between 20,000 to 25,000 cars in the 600cc category and eventually 45,000 cars annually (Jamilah Mohamad, 1994). MTRG (2003) concludes that national car policy with its various measures promotes car ownership and hampers any effort to adopt transport policy that discourages the ownership and use of private cars.

There is limited government support for public transportation. However, participation from private sector is a big share and has been increasing over recent years, especially in providing infrastructure and mode of rail-based mass transit services. The main issue concerning with public transport in Kuala Lumpur is the absence of focus and coordination at all levels throughout the system. In addition, there is also a lack of integration at the system level between various modes and within each mode (after: MTRG, 2003; Ward, 2002; Schwarcz, 2003; and Zakaria, 2003). However, the government is now keen on integrating some public transportation modes.

The principal means of traffic control includes a computer-based area traffic coordination system, a one-way street system, reversible lanes, exclusive bus and or taxi lanes, penalties for illegal on-street parking, and heavy vehicle banning during peak hours (after: Jamilah Mohamad, 1994; MTRG, 2003 and Breithaupt, 2003). There has been no concrete travel demand management in Kuala Lumpur. Once, car-pooling measure was attempted by the City Hall but was unsuccessful. Public support of the program was low. The reason was addressed to behavioral factors, such as different work schedule as well as before and after work activities (Rahman, 1995). Although the importance of TDM is clearly acknowledged in the draft of Kuala Lumpur Structure Plan, no specific measures are indicated (after: MTRG, 2003).

4.3.5 Manila

Metro Manila is the major developing urban center in the Philippines, designated as its National Capital Region (NCR). Occupying an area of 636 square kilometers, the region comprises 17 local government units (LGU), each with its own mayor and administration. Current residential population is around 10 million people, but daytime population is estimated to reach well beyond 12 million people.

Metro Manila Urban Integration Study (MMUTIS) in 1996 estimated that by 2010 Metro Manila and its surrounding areas would form a megapolis with total population of 22.7 million people. Trend in urbanization, matched with the rapid rate of motorization and coupled with widespread urban poverty, signifies a big challenge to public authorities and others seeking to provide decent urban services, including transportation services, that impact on the daily lifestyle of almost every citizen (after: Uranza, 2002).

As the result of the big mismatch between the fast-growing transportation demand and inadequate supply capacity (road networks), Metro Manila has been experiencing severe traffic congestion. The congestion accounts for many negative impacts, such as worsening air quality, wasted fuel, long travel time and frayed tempers. Consequently, a remarkable economic cost of congestion is identified (MMUTIS report as cited in Llorito, 2002a).

However, this problem would unlikely become worse if there was an integrated master plan agreed upon by the cities and municipalities that make up Metro Manila. Lidasan in Llorito (2002b) argue that most major land use projects in the NCR did not follow any plan which could be identified with any particular land use or zoning policy. Further, he emphasizes that traffic congestion was also the manifestation of the intertwining technical and institutional problems in the region. In Metro Manila, the concept of a functional road hierarchy has largely been lost. Uranza (2002) cited this fact as an exacerbating factor for traffic congestion and poor environmental conditions. In traffic operation level, Cracknell (2000) and Uranza (2002) stated that the lack of appreciation by the traffic police of their role in traffic management was also an aggravating contribution.

Amid the recent effort to initiate an integrated medium and long term urban development planning, in urban transport context, the authority has been developing rail-based mass transit system (i.e. Light Rail Transit and Metro Rail Transit), and operating some short-term TDM measures to reduce vehicle usage in Metro Manila's road network. These measures include the Unified Vehicular Volume Reduction Program (UVVRP), also known as "color-coding", and "odd-even number" scheme. UVVRP is aimed at banning vehicles one day per-week on all streets, on the basis of plate number ending, whereas odd-even scheme is the banning of vehicles with odd or even number ending to enter selected streets on selected days. The program was first implemented in 1996.

The aforesaid UVRP measure is known only effective in short-term in shifting people from private cars to public transport, so long as they do not make adjustments by buying additional cars to drive on days when their regular cars are banned. Uranza (2002) stated that the impact of UVVRP implementation was largely unknown, since no formal monitoring studies had been conducted. As for the odd-even number scheme, it has been criticized as confusing to motorists and probably led to an increasing use of unsuitable minor roads (after: Uranza, 2002). However, MMUTIS points out that the UVVRP has actually gained a high social acceptability.

The UVVRP measure was recently suspended by the MMDA (Metro Manila Development Authority). However, after some evaluation it will be re-applied again to include public transport as well, which in Manila case the sector is totally served by private companies. A controversy has erupted with this policy. Cal (2003) criticizes while such a traffic restraint measure is needed in Metro Manila; its introduction should not cover public transport modes and should not miss its complementary measures.

The other TDM measures implemented in Metro Manila include the prohibition of 'provincial' buses to enter Metro Manila, truck ban and truck routes (Uranza, 2002), and bus priority or busways (Cracknell, 2000). All are aimed at restraining traffic volume. However, incomplete planning and design has caused busway schemes to be less effective and abandoned in an early stage of implementation (Halcrow, 2000). The implementation of truck ban and truck routes policy is reviewed recently. Despite the significant success in keeping large trucks from major routes, many routes utilizing secondary road network have been generating environmental nuisances. In addition, limiting cargo traffic between areas might hamper crucial economic activity.

4.4 CONTRASTING THE PATHS IN SOUTHEAST ASIAN EXPERIENCES ON TDM

The following illustration (Figure 4.1) sums up and describes the status of TDM in urban transport policy in five Southeast Asian cities, including Singapore, Bangkok, Kuala Lumpur, Jakarta and Manila.

The illustration shows that Singapore is the only city, within the context of this study, which has acknowledged the importance of demand management from the very beginning, as an integral part of its urban transportation policy. Various restraint measures, including car ownership and car use, were and are used vigorously to slow down the growth of private motorization. Some restraint schemes were even enforced earlier, before any substantial public transportation systems came into existence.

According to Dakhal (2003), the above-mentioned strategies work effectively for Singapore mainly because of the synergetic effects from the government's policy and the characteristics of the society. Singapore has a strong legislative and institutional framework, low opposition from the society, and other localized favorable conditions that made possible for the authority to control the flow of goods and services in and out of the city-state. Another important factor contributing to the success is probably the right decision that was made in the right time. Singapore's decision to vigorously and consistently restraint private mobility and turn into a transit city was put on force when the city's car ownership was still low (Table VI-1). As a result, substantial mass transit systems could be provided in time to compete with private vehicles.

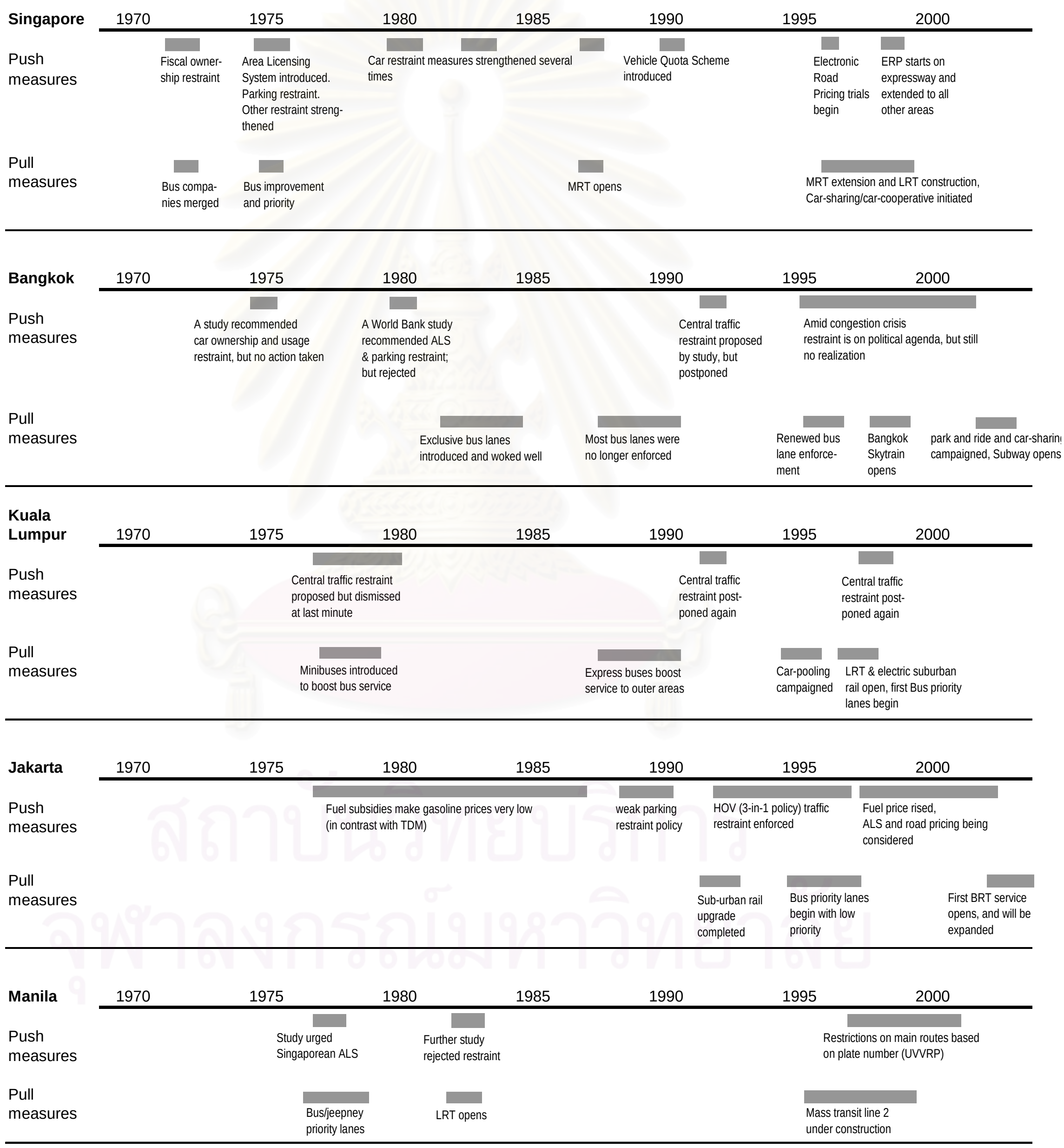


Figure IV-1 Comparison of the status of TDM Push and Pull measures in some ASEAN cities (adapted from various sources)

Table IV-1 Car and Motorcycle Ownership in ASEAN cities, 1960 – 1993 (Source: Barter, 1999)

	Car ownership (unit/1000 person) [Motorcycle ownership (unit/1000 person)]				
	1960	**1970**	**1980**	**1990**	**1993**
Singapore	39	69	64	101	110
	[12]	[51]	[49]	[45]	[42]
Bangkok	14	54	71	199	220
	[6]	[20]	[35]	[124]	[179]
Kuala Lumpur	46	72	86	170	206
	[?]	[50]	[65]	[180]	[201]
Jakarta	?	22	38	75	92
	[?]	[32]	[66]	[98]	[113]
Manila	?	38	55	66	79
	[?]	[6]	[4]	[6]	[8]

In contrast with Singapore's case, TDM push measures, in terms of restraining private car use and ownership, have so far never been implemented in Kuala Lumpur and Bangkok, albeit some studies have urged to do so. As mentioned earlier, the policy of these cities toward car ownership and usage apparently has rather been to let them grow unconstrained and cope with them through road building and other reactive measures. This policy may not be impossible for Kuala Lumpur since it features a very low density. However, for Bangkok the policy has brought the urban transportation into a well-known congestion crisis.

The main way of diverting commuters from using their private cars in Bangkok and Kuala Lumpur has been through provision and promotion of public transportation. According to Barter (1999), the examples of Singapore's restraint schemes are in fact well known to decision makers in Bangkok and Kuala Lumpur. However, they are often dismissed as unsuitable models with reasons that include locally favorable situations. It is generally not appreciated that the good public transportation systems in cities like Singapore, to which they refer as prerequisite to restraint, did not exist at the time car restraint was introduced, but rather were developed after restraint had come into effect.

In Jakarta and Manila, some forms of traffic (car use) restraint are enforced, albeit these measures are only a mild compared with those of Singapore. There is no ownership restraint scheme imposed in these two cities. In the case of Bangkok and Kuala Lumpur, keen efforts are being undertaken to promote public transportation services.

Chapter V
Data Collection and Preliminary Analysis of Social Feasibility Issues

5.1 INTRODUCTION

Having now examined the experiences of some major cities in implementing TDM programs, this chapter turns to investigating the social feasibility that is assumed to be an important precondition to successful implementation of TDM policies. The investigation is carried out in four major cities previously mentioned, excluding Singapore. The questionnaire developed in Chapter III was distributed among the motorists in each city. In this chapter, their answers are analyzed and compared. Prior to the analysis, the chapter begins with describing the sampling method and the characteristics of the sample.

5.2 SAMPLING METHOD AND SAMPLE DESCRIPTION

5.2.1 Sampling Method

The surveys were carried out from November 2004 to January 2005 and conducted by a local team of surveyors. In each city, the survey was done in central development and business areas. For Bangkok, areas of Siam, Sukuhmvit, Silom, and area were chosen. In Jakarta, the survey was focused around Central Jakarta District (Jakarta Pusat). In Kuala Lumpur, the survey was conducted within the Central Planning Area, while in Manila the survey was done in the City of Manila. In most cases, the surveyors would do a little talk to the people who were willing to participate, gave each of them a set of questionnaire, and asked them to complete the questionnaire themselves. The sample consisted of motorists exclusively, i.e. those who commute using private car within the city center's road network. Due to technical difficulties and budget constraints, the total sample of the four cities (Bangkok, Jakarta, Kuala Lumpur, and Manila) is by no means representative.

5.2.2 Sample Description

The whole sample contains 691 persons interviewed (Table V-1), with Manila and Jakarta share the largest (N=219) and the smallest (N=122) sample sizes, respectively.

Table V-1 Sample sizes

	Bangkok	Jakarta	Kuala Lumpur	Manila	Total
total	199	122	151	219	691
female	33.67%	27.87%	43.05%	31.51%	34.01%
male	66.33%	72.13%	56.95%	68.49%	65.99%
mean age	33.20	29.54	31.07	30.21	31.15

The sex distribution of the sample reflects only a fair approximation to the ratio of active car drivers of women and men. The mean age is 31.15 years with a standard deviation of 9.6 years. This shows that the data has a tendency to be biased toward the young commuters, especially for Manila's case where one-third of the sample is from the first age group (20 years old and below). The next figures illustrate the distribution of age groups and monthly family income in the four cities (Figures V-1 to V-2).

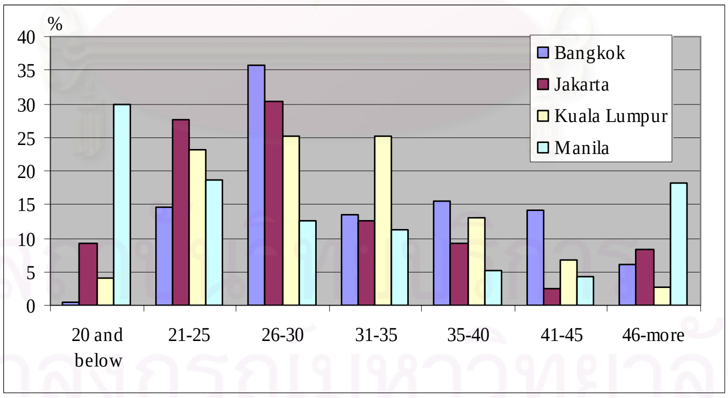
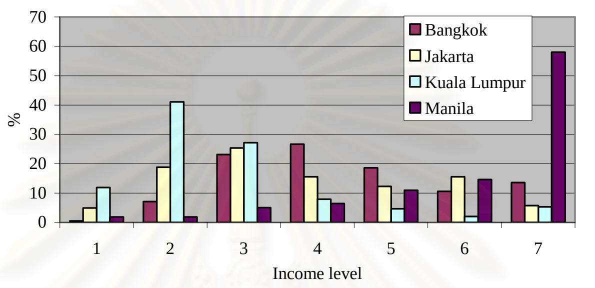


Figure V-1 Age distribution in percents

In the case of income level (Figure V-2), a unique set of intervals was applied for each city to correspond with the fact that parameters (central tendency and spread) of income distributions are different between cities. However, the intervals applied for Kuala Lumpur appear to overestimate the sample's distribution of income by having the majority of data caught in the lower intervals. In contrast with Kuala Lumpur is the Manila's case, where more than 50% of the data clumps together in the highest class interval. This situation implies that income level should be considered with caution if it were to be used as an explanatory variable in the subsequent analysis, especially when pooled models are concerned.



Income level	Bangkok (THB)	Jakarta (thousand IDR)	Kuala Lumpur (MYR)	Manila (PHP)
1	5,000 or below	less than 1000	1,000 or less	3,000 or less
2	5,001 to 10,000	1,000 - 2,000	1,001 to 3,000	3,001 to 6,000
3	10,001 to 20,000	2,000 - 3,000	3,001 to 5,000	6,001 to 10,000
4	20,000 to 30,000	3,000 - 4,000	5,001 to 7,000	10,001 to 15,000
5	30,000 to 40,000	4,000 - 5,000	7,001 to 8,000	15,001 to 20,000
6	40,001 to 50,000	5,000 - 10,000	8,001 to 10,000	20,001 to 30,000
7	50,001 or more	10,000 or more	10,001 or more	30,001 or more

note: current exchange rate: USD 1 = THB 39 = IDR 8700 = MYR 3.7 = PHP 56.5

Figure V-2 Distribution of household's gross income per month

Tables V-2, V-3, and V-4 show the household size, the number of persons under 18 per household and the employment status of the respondents. Bangkok represents comparatively small household sizes, while Manila stands for larger family size. There is a considerable missing data for household size and people under 18 years old per household in Jakarta.

Table V-2 Household size

Persons	Bangkok (%)	Jakarta (%)	Kuala Lumpur (%)	Manila (%)
1	5.0	2.5	7.3	1.1
2	17.6	6.6	12.6	2.2
3	27.6	13.9	17.2	8.3
4	23.1	25.4	15.2	18.3
5	7.5	13.1	16.6	20.6
6	7.5	9.8	17.2	19.4
7	4.5	4.1	4.0	12.2
8	2.0	1.6	1.3	9.4
9	2.0	0.0	0.0	5.6
10+	2.0	1.6	2.0	13.9
missing value	1.0	21.3	6.6	8.7

Table V-3 Number of persons under 18 years old per household

Persons	Bangkok (%)	Jakarta (%)	Kuala Lumpur (%)	Manila (%)
0	61.8	31.1	33.8	38.9
1	25.1	18.9	19.2	25.6
2	10.6	18.0	21.2	26.7
3	0.5	4.9	11.9	9.4
4+	1.0	5.7	7.3	10.6
missing value	1.0	21.3	6.6	10.6

Table V-4 Employment status

Employment Status	%
Government officials	24.46
Self employed	15.20
Work for private agencies/companies	40.09
Unemployed	1.45
Student	16.64
Retirement	0.58
Other	1.16
missing value	0.43

Finally, the following Table V-5 describes the information regarding the most frequent mode the respondents use to commute to work or school.

Table V-5 Primary moving modus to daily mandatory trips (in %)

Private car (I drive)	Private car (share with family/friends)	School-bus/office-bus	Public transport	Non-motorized vehicle	Walk	Missing value
67.29	16.64	0.58	12.45	1.59	0.87	0.58

5.3 SITE-SPECIFIC RESULTS

In this section, the descriptive results are shown separately for the different sites. The presentation follows the theoretical considerations outlined in Chapter II. First, frequency distributions and mean values of the variables regarding the traffic situation in general are reported (problem perception, attribution of responsibility, etc.). Then the variables which are directly connected with the proposed TDM measures (information, perceived effectiveness, personal outcome expectation, acceptability and behavioral intentions) are presented for each policy package: first for Package *A*, then for Package *B*, and then for Package *C*. In the subsequent section, the overall site for site results will be presented.

5.3.1 Bangkok

The traffic problems of Bangkok are well-known nightmare and have been considered serious since early 1970's when the first major transportation study carried out in the metropolitan area by a German team and the Ministry of Interior suggested some TDM programs to be initiated. However, as described in the previous chapter, until recently, the significant role of TDM has been largely ignored despite recommendations invariably suggested by many following studies.

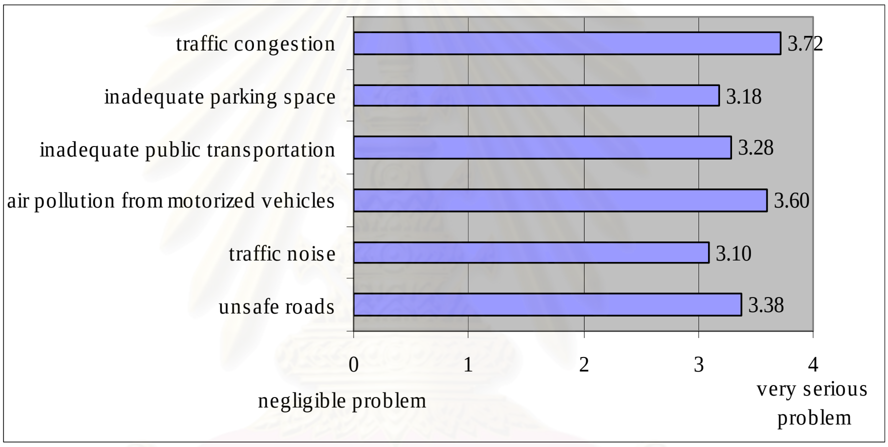


Figure V-3 General problem perception: mean values.

The first two questions deal with problems caused by traffic. The first concerns the perception of problems as *general* problem for the society as a whole, while the second concerns the transportation problems affect the respondents themselves, i.e. the personal *affectedness* by the problems. Six problems had to be evaluated: traffic congestion, insufficient parking space, inadequate public transportation, air pollution from motorized vehicles, traffic noise and unsafe roads. The general problem perception is very high. On a scale of 0 to 4, the average rating of the six problems as societal problem in general is at 3.38 with a standard deviation of 0.24. The two-most pressing problems are traffic congestion and air pollution from motorized vehicles and the rest is also seen as at least serious problem (Figure V-3).

Table V-6 Personal problem perception (affectedness in %)

	% of people who seriously and very seriously affected
traffic congestion	96.48
inadequate parking space	73.87
inadequate public transportation	77.89
air pollution from motorized vehicles	89.45
traffic noise	71.86
unsafe roads	82.41

The next question refers to the perception in which way transportation problems affect the respondents themselves (Table V-6). Almost all of the respondents are affected by traffic congestion and air pollution, and more than 70% are affected by inadequate parking space, insufficient public transportation, traffic noise and unsafe roads. There seems to be no difference between the general and the personal problem perception in Bangkok sample. Both are ranked extremely high.

Table V-7 Problem expectation for the next 5 years (in %)

	getting worse	stay the same	getting better
traffic congestion	58.29	22.11	19.60
inadequate parking space	58.79	23.62	17.59
inadequate public transportation	43.22	23.12	33.67
air pollution from motorized vehicles	64.82	13.07	22.11
traffic noise	52.76	26.63	20.60
unsafe roads	49.25	21.61	29.15

The negative perception of current transportation problems continues for the expectation regarding the development of the situation (Table V-7). In general, this expectation tends to be negative. At least around 70% of the respondents expect the problems to be worse or at same state over the next 5 years.

Table V-8 A need to limit the traffic (in %)

not at all	not really	only slightly	to some extent	certainly
3.02	9.05	25.13	20.10	42.71

With such pressing problems, there is a good consciousness that the majority of the respondents (62%) feel the need to limit car traffic (Table V-8), at least to some extent. However, this does not consider how to obtain this reduction. Another good sign is that when asked to attribute the responsibility to solve the prevailing transportation problems, the respondents indicate that all parties, including the motorists and themselves, should responsible (Figure V-4).

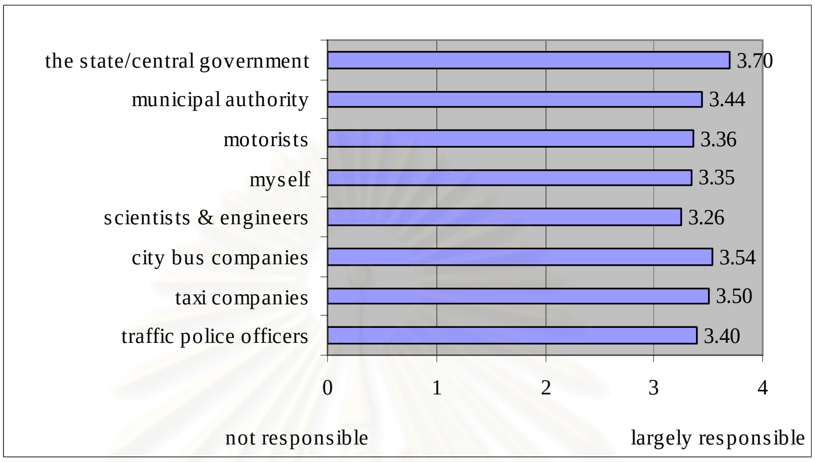


Figure V-4 Attribution of responsibility for the solution of perceived problems (mean)

The next question deals with perceived dependency on car use. Only less than 10% of the respondents indicate that it is not difficult for them to use mode other than their car (Table V-9). This reflects a very high dependency on car use and would probably make TDM measures hardly acceptable.

Table V-9 Perceived difficulty to reduce automobile trips substantially (in %)

not difficult at all	not really difficult	difficult to some extent	difficult	very difficult
6.03	3.02	21.61	34.17	35.18

The question of whether car driving becomes more expensive in the future is answered in Table V-10. Some 85% of the respondents expect it be more expensive. This may serves as background information about general cost expectation related to car use. However, when the respondents were asked further to indicate to what extent they expect their personal trips being affected by the increased cost (Figure V-5), it seems that it would not make them drive substantially less. As an illustration, from a scale of 0 to –4 indicating ‘no changes in driving’ to ‘driving substantially less’, the elasticities for work/school trips and leisure trips are still higher than –2. Only for shopping trips the respondents indicate an elasticity of less than –2.

Table V-10 Expectation that driving will be more expensive in the future (in %)

not at all	probably no	Probably	almost certainly	certainly
3.02	0.50	11.06	22.61	62.81

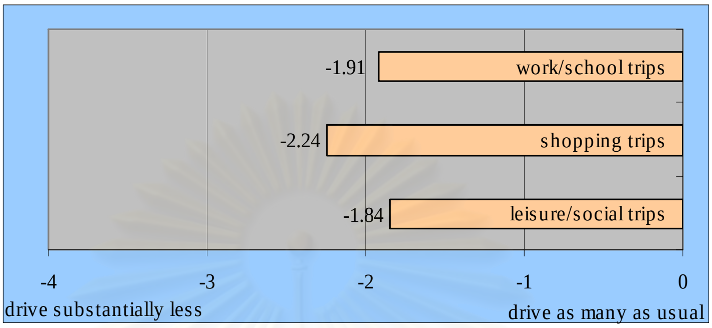


Figure V-5 Self reported elasticity of driving for various trip purposes when driving becomes more expensive (mean values)

Having explained the background information about problem awareness, attribution of responsibility, and car dependency, in the following the results of the evaluation toward proposed TDM strategies are presented.

All the three packages consist of three measures. The first and the third measures in each package are essentially the same. The distinct feature is in the second program, where 3-in-1 based, plate-license based, and pricing based restraint strategies are introduced in Packages *A*, *B*, and *C*, respectively. Table V-11 indicates that the persons interviewed in Bangkok are more familiar with Package *A*, while Package *C* that contains the pricing-based restraint program is relatively unknown.

Table V-11 Information about the TDM Packages (in %)

	never heard at all	know a little	know somewhat	know a lot
Package A	17.59	21.61	22.61	38.19
Package B	38.69	18.09	31.16	12.06
Package C	50.75	16.08	24.12	9.05

The evaluation of the effectiveness plays a major role in the acceptability model. Although there may be a paradox in perceived effectiveness and acceptability relation (Steg, 2003), it is hypothesized in this study that the higher the perceived effectiveness of a problem solving measure is, the more attractive and therefore acceptable will it become (Reinstra et al., 1999). The rates of effectiveness-evaluation in the case of Bangkok sample for all packages are balanced (Table IV-12). As a whole, the respondents are not completely sure about the effects of Packages *A*, *B* and *C*. Only small parts rate the packages as absolutely ineffective or absolutely effective.

Table V-12 Perceived effectiveness of the TDM Packages (in %)

	will not work at all	will have slight effect	will have some effect	will have large effect	will work very effectively
Package A	10.05	22.61	38.69	16.58	12.06
Package B	12.56	14.07	52.76	17.09	3.52
Package C	17.59	8.04	45.73	16.08	12.56

The next issue considered a basic requirement for acceptability is perceived fairness or justice. Table V-13 reports the perceived fairness of Bangkok respondents for each policy package. It is hypothesized that those who expect advantages from the policy would be more willing to accept the policy. The table shows that roughly 50% of the respondents indicated to be disadvantaged and rather disadvantaged by all packages. About 30% felt no importance to the packages, and only slightly below 20% expected advantages from the policies. These results correspond with the high dependency of car use previously revealed. These may also imply that the respondents did not see enough that the pull measure introduced in each package (i.e. public transport improvement) would benefit their mobility. Evaluation of the three packages, in the context of personal outcome expectation, tends to follow a general trend toward respondents' disadvantages.

Table V-13 General Personal outcome expectation in the case of each Package (in %)

	disadvantaged	rather disadvantaged	no importance to me	rather advantaged	advantaged
Package A	22.11	24.62	31.66	13.57	8.04
Package B	23.12	30.65	30.15	8.54	7.54
Package C	20.60	31.66	28.14	17.09	2.51

Table V-14 shows respondents' evaluation concerning the acceptability of the three packages. More than a half indicated neutral favor to Package *A* with a roughly balanced rate between negative and positive acceptability. Compared with the other two packages, Package *A* may be considered softer in that it only imposes a mild restraint for car use. Car users still can use their cars provided they incorporate more passengers. Stronger restrictions may be felt by the respondents when it comes to evaluate Packages *B* and *C*, because it totally bans their cars in a given day (Package *B*) and has them pay a substantial amount of additional money to access congested (heavily demanded) routes (Package *C*). These may explain the increase in the rejection side (absolutely unacceptable and rather unacceptable) of the last two packages.

Table V-14 Acceptability of the TDM Packages (in %)

	absolutely unacceptable	rather unacceptable	neither unacceptable nor acceptable	rather acceptable	totally acceptable
Package A	6.03	19.10	55.28	11.56	8.04
Package B	14.57	28.14	43.22	9.05	5.03
Package C	18.09	27.64	34.17	9.55	10.55

Table V-15 presents the subjective (or social) norm perceived by Bangkok sample. Social norm refers to the respondents' assumption about whether their important others (family, friends, etc) would think that they should accept the policies. Generally, the more favorable the subjective norm with respect to the presented TDM policies, the stronger should be an individual's acceptability of the policies. For the three packages, it can be seen that 35% to 50% of the respondents stated that their important others were unlikely think that they should accept the proposed policies.

Table V-15 Perceived social pressure to accept the proposed Packages (in %)

	very unlikely	rather unlikely	neither unlikely nor likely	rather likely	very likely
Package A	16.08	19.60	38.69	19.10	6.53
Package B	21.11	24.62	36.68	9.05	8.54
Package C	20.60	30.15	26.63	17.59	5.03

Expressed intentions, as found here (Table V-16 and V-17), are an indicator of what could happen after the introduction of a measure, at least to some extent. It is difficult, however, to define the supposed right behavior in each case. Only tentatively, the opportunity to respond to the measure can be differentiated into two subgroups, i.e. intentions to reduce car use and/or to switch to other modes, and intentions to maintain current car use, at least in a modified manner. These differentiations will be examined statistically latter, in Chapter VI.

In Bangkok sample, there were about 30% of the respondents who were not sure whether they would take a particular action if the packages were to be imposed. The overall answers scatter to all response categories. But there seems a tendency that the motorists would use public transportation more often. Other alternatives offered to modify car use, e.g. join car-sharing/ride-sharing programs, use non-motorized transportation seem to be implausible. A tendency to support a movement to stop the policies is also indicated.

Table V-16 Expressed intentions in the case of Package *A* (in %)

Package A	certainly not	probably not	not sure	probably yes	certainly yes
Drive my car less	8.54	29.15	33.17	17.59	11.56
Use public transport more often	4.52	10.55	30.15	34.67	20.10
Use bicycle/NMT/walk more	35.68	24.12	18.59	14.07	7.54
Join in car-sharing/ride-sharing programs	20.10	38.69	26.13	7.54	7.54
Try to fill extra passengers into my car where the access restriction is imposed	20.10	32.16	21.61	19.10	7.04
Avoid driving the routes where the access restriction is imposed	12.56	13.57	36.68	21.61	15.58
Park inside restriction area and pay parking charge	18.09	26.13	31.66	12.06	12.06
Support a movement to stop the strategy	8.54	6.03	40.20	27.14	18.09
Park my car beyond the restricted area and use public transport to travel within that area	12.06	22.11	30.65	21.11	14.07

Some TDM measures, particularly the price-based measures, would help to raise public funds. In connection with acceptability issues, some studies (e.g. Thrope et al. 2000) report that revenue allocation, when informed to the respondents before they were to evaluate the acceptability of a price-based policy, would influence, i.e. tend to increase their level of acceptability. This is perhaps because they know, at least tentatively, that they would not pay for nothing and could see where their money will go.

Table V-17 Expressed intentions in the case of Package *B* and *C* (in %)

Package B	certainly not	probably not	not sure	probably yes	certainly yes
Drive my car as usual whenever the access is granted	12.56	16.08	37.69	22.11	11.56
Use public transport more often	6.53	15.08	38.69	29.65	10.05
Use bicycle/NMT/walk more	30.65	22.61	29.15	13.07	4.52
Drive less even during days permitted to drive	11.56	19.60	41.21	16.58	11.06
Join in car-sharing/ride-sharing programs	17.59	29.65	32.16	9.55	11.06
Buy second car so I can drive more	45.23	19.60	18.09	10.55	6.53
Park my car as usual (within the restricted area) during the days permitted to drive	10.55	20.60	43.72	15.58	9.55
Support a movement to stop the strategy	12.56	20.10	27.14	23.62	16.58
Park my car beyond the restricted area and use public transport to travel within that area	12.06	19.10	46.23	12.06	10.55
Package C					
Drive my car less	18.09	27.64	38.19	7.04	9.05
Use public transport more often	12.06	21.11	34.17	18.09	14.57
Use bicycle/NMT/walk more	35.18	24.12	27.64	10.05	3.02
Join in car-sharing/ride-sharing programs	20.10	31.66	31.66	13.07	3.52
Pay charges and drive/park as usual	17.09	17.59	43.22	12.56	9.55
Support a movement to stop the strategy	10.55	16.08	35.68	24.62	13.07
Ask my office/family to reimburse my expenses on the charges	21.61	15.08	22.61	25.13	15.58
Support a movement to organize office-bus/school-bus	13.57	9.55	26.63	25.63	24.62

In this study, however, the aforesaid aspect was not investigated. Nevertheless, there is a question to investigate respondents' preferences on how the revenues should be used. Another closely related question is whether they think the government would use the revenues as they expect (Figure V-6).

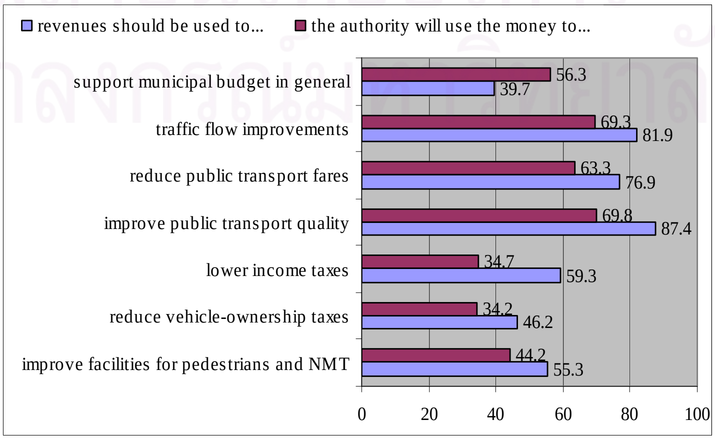


Figure V-6 Hypothetic revenue allocation (confirmative responses in %)

The figure shows that there is a high hope that the revenues should be used to improve public transportation and traffic flow. The expectation is accompanied with a little lower level of trust that the government would do as expected.

Finally, there is a question to deeper investigate the intrapersonal outcome expectation if one is to pay more for driving. It can be hypothesized that if people expect more positive outcomes than the negatives for themselves, then they may be more willing to accept the measure.

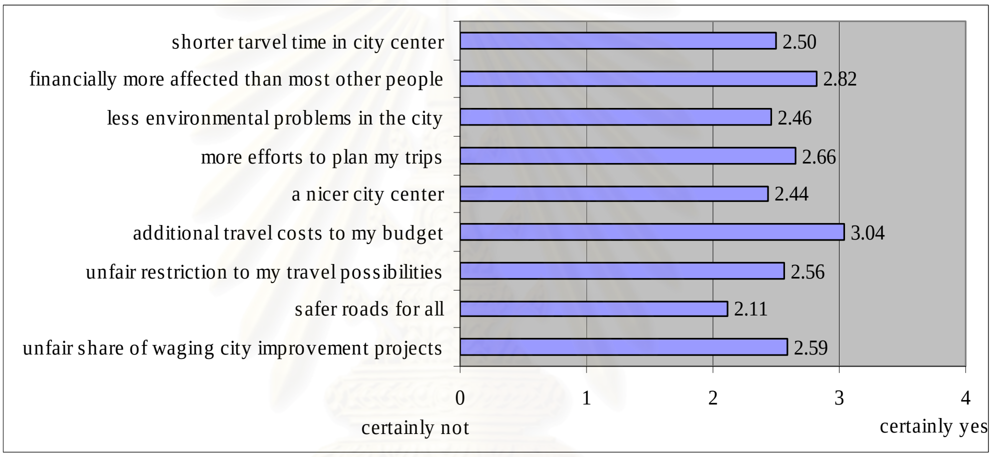


Figure V-7 Equity outcome expectations in the general case of price-based TDM policies

Figure V-7 shows that the expectation of additional costs to budget is almost certainly anticipated. This exceeds other benefits such as shorter travel time in the city center, less environmental problems, and safer road networks. These results explain that pricing-based measure (as the one represented by Package *C*) leaves negative impression to the respondents.

5.3.2 Jakarta

The results of the survey in Jakarta, in the context of problem perception, reveal similar trends with those of Bangkok, but in a little lesser magnitude. The two-most annoying transportation problems for the whole society are traffic congestion and air pollution from motorized vehicles (Figure V-8). In fact, these two problems are rated the most serious problems throughout the study area.

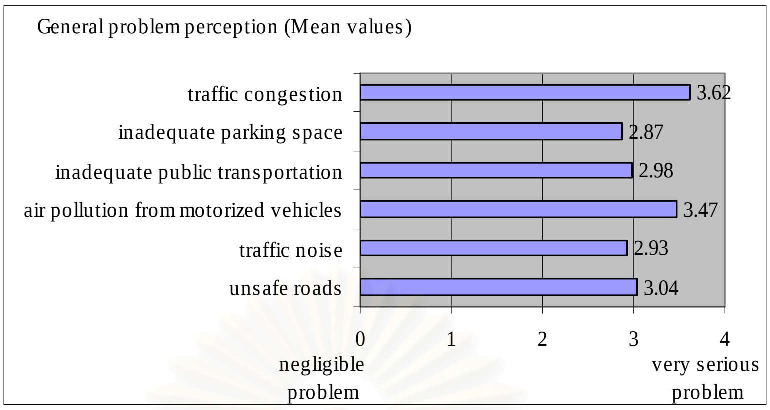


Figure V-8 General problem perception: mean values.

The affectedness by the problems confirms the results above (Table V-18). More than 90% of the respondents report that they are affected by traffic congestion and air pollution. More than 70% are affected by unsafe roads, and more than 60% are affected by the rest of the problems.

Table V-18 Personal problem perception (affectedness in %)

	% of people seriously and very seriously affected
traffic congestion	91.80
inadequate parking space	64.75
inadequate public transportation	63.93
air pollution from motorized vehicles	90.16
traffic noise	69.67
unsafe roads	74.59

Concerning the expectations about further development (Table V-19), a majority of the respondents expect deteriorating future situations for all problems. Only in the case of inadequate public transportation, slightly higher percentage expect improving situation in the future.

Table V-19 Problem expectation (in %)

	getting worse	stay the same	getting better
traffic congestion	76.23	16.39	7.38
inadequate parking space	68.85	24.59	6.56
inadequate public transportation	41.80	34.43	23.77
air pollution from motorized vehicles	83.61	6.56	9.84
traffic noise	75.41	17.21	7.38
unsafe roads	50.82	31.15	18.03

Compared to Bangkok sample, the respondents of Jakarta express a more certain state about the need to limit the vehicular traffic (Table V-20). More than 80% indicate the need, at least, to some extent.

Table V-20 A need to limit the traffic (in %)

not at all	not really	only slightly	to some extent	certainly
1.64	1.64	10.66	22.95	63.11

Regarding to who should be responsible for the solution of problems (Figure V-9), the respondents attribute highest responsibility to the municipal authority. A considerable responsibility is also attributed to the other parties, except the planners (scientists and engineers).

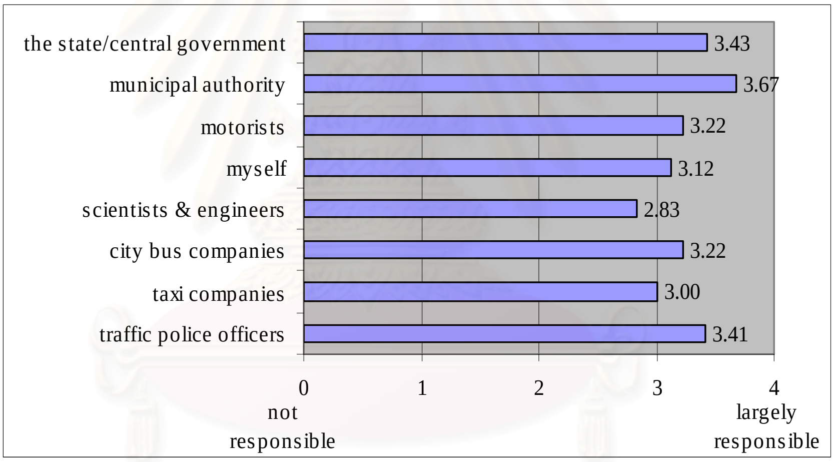


Figure V-9 Attribution of responsibility for the solution of perceived problems (mean)

In Jakarta, where the need to limit the amount of traffic is more perceived than in Bangkok, there is also a high level of car dependency (Table V-21). Only about 20% of the respondents indicated at least not really difficult for them to reduce car trips substantially.

Table V-21 Perceived difficulty to reduce automobile trips substantially (in %)

not difficult at all	not really difficult	difficult to some extent	difficult	very difficult
4.10	18.85	25.41	27.05	24.59

When this information is cross-examined with car use for various trip purposes, the results (Figure V-10) reveal a different pattern with that of Bangkok. It is likely more difficult for Jakarta sample to give up driving for leisure/social purposes than driving for the other purposes.

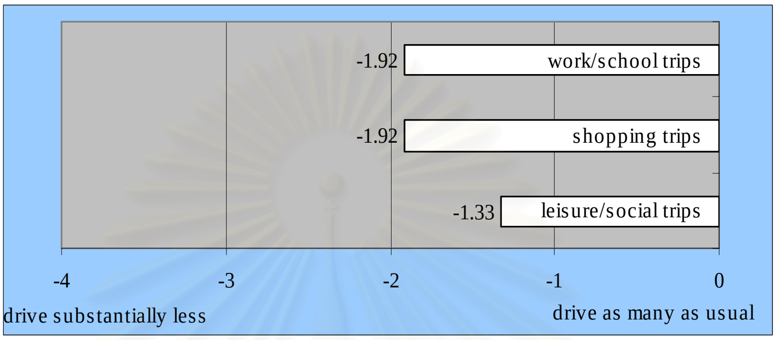


Figure V-10 Self reported elasticity of driving for various trip purposes when driving becomes more expensive (mean values)

Similar to Bangkok, the persons asked in Jakarta expect that car driving will become more expensive in the future (Table V-22).

Table V-22 Expectation that driving will be more expensive in the future (in %)

not at all	probably no	probably	almost certainly	certainly
1.64	2.46	21.31	31.97	42.62

Regarding the subjective knowledge about the proposed TDM packages, the majority of the interviewees stated that they are more familiar with Package *A* (Table V-23). This is to be expected, since the 3-in-1 car restraint measure introduced in Package *A* is in fact adopted from Jakarta. In addition, people there are also anticipating a government plan to increase parking charges. Package *C*, which contains a form of road-pricing scheme, is relatively unknown to the respondents despite there has been a long talk to apply such a measure between the authority and some consultants.

Table V-23 Information about the TDM Packages (in %)

	never heard at all	know a little	know somewhat	know a lot
Package A	22.13	13.11	33.61	31.15
Package B	30.33	11.48	28.69	29.51
Package C	54.10	18.03	20.49	7.38

As shown in Table V-24, the evaluation of the effectiveness of Package *B* and *C* are rather pessimistic. As for the relatively known package, i.e. Package A, there is a relatively balanced rate for both, pessimistic and optimistic sides.

Table V-24 Perceived effectiveness of the proposed Packages (in %)

	will not work at all	will have slight effect	will have some effect	will have large effect	will work very effectively
Package A	7.38	24.59	37.70	24.59	5.74
Package B	25.41	29.51	27.87	13.11	4.10
Package C	25.41	29.51	22.13	18.85	4.10

Correspondingly, the personal outcome expectations for Package *B* and *C* are rather negative as well (Table V-25). Again, there is a balanced rate in the case of Package *A* for both negative and positive sides.

Table V-25 General Personal outcome expectation in the case of each Package (in %)

	disadvantaged	rather disadvantaged	no importance to me	rather advantaged	advantaged
Package A	9.84	19.67	37.70	18.03	14.75
Package B	26.23	17.21	40.98	13.11	2.46
Package C	23.77	30.33	34.43	10.66	0.82

Regarding the acceptability of the introduced packages, there is a considerable portion of neutral favor for each package (Table V-26). The remaining votes tend to shift toward rejection side than acceptance side. This holds for the three packages, and even for the widely known Package *A*.

Table V-26 Acceptability of the proposed TDM Policy Package (in %)

	absolutely unacceptable	rather unacceptable	neither unacceptable nor acceptable	rather acceptable	totally acceptable
Package A	11.48	19.67	42.62	16.39	9.84
Package B	23.77	27.87	31.97	11.48	4.92
Package C	18.85	31.15	30.33	14.75	4.92

Relatively consistent to the evaluation of acceptability, the perceived social pressure to accept the proposed policies indicates the similar trends. These results are shown in Table V-27.

Table V-27 Perceived social pressure to accept the proposed Packages (in %)

	very unlikely	rather unlikely	neither unlikely nor likely	rather likely	very likely
Package A	8.20	13.11	42.62	18.85	17.21
Package B	19.67	18.85	46.72	11.48	3.28
Package C	22.13	28.69	39.34	7.38	2.46

The next table sums up the behavioral intentions upon the application of Packages *A*, *B* and *C*. Similar to Bangkok, in the Jakarta sample there is an intention to use public transportation more often, especially against the imposition of Package *B* and *C*. There is also a high tendency to support the use of staff and school buses, which could be considered another alternative to car use. As indicated in Table V-28, the choice of utilizing non-motorized transportation is highly implausible. This, in fact, holds for Bangkok all other cities in this study. Finally, support to stop the policy is higher in the case of Package *C*, which contains pricing-based strategy, as compared to the other packages.

Table V-28 Expressed intentions in the case of Package *A*, *B* and *C* (in %)

Package A	certainly not	probably not	not sure	probably yes	certainly yes
Drive my car less	13.11	16.39	29.51	27.87	13.11
Use public transport more often	8.20	15.57	29.51	27.87	18.85
Use bicycle/NMT/walk more	27.05	27.87	26.23	11.48	7.38
Join in car-sharing/ride-sharing programs	16.39	14.75	37.70	22.95	8.20
Try to fill extra passengers into my car where the access restriction is imposed	30.33	13.11	36.07	13.11	7.38
Avoid driving the routes where the access restriction is imposed	4.10	1.64	24.59	33.61	36.07
Park inside restriction area and pay parking charge	25.41	30.33	28.69	9.84	5.74
Support a movement to stop the strategy	23.77	22.95	33.61	9.84	9.84
Park my car beyond the restricted area and use public transport to travel within that area	18.85	14.75	27.87	25.41	13.11
Package B					
Drive my car as usual whenever the access is granted	9.02	12.30	35.25	17.21	26.23
Use public transport more often	9.02	10.66	27.05	36.07	17.21
Use bicycle/NMT/walk more	32.79	25.41	27.87	8.20	5.74
Drive less even during days permitted to drive	19.67	18.85	40.98	12.30	8.20
Join in car-sharing/ride-sharing programs	18.85	13.11	41.80	16.39	9.84
Buy second car so I can drive more	48.36	18.03	18.03	9.84	5.74
Park my car as usual (within the restricted area) during the days permitted to drive	16.39	26.23	36.07	10.66	10.66
Support a movement to stop the strategy	18.03	22.13	34.43	8.20	17.21
Park my car beyond the restricted area and use public transport to travel within that area	16.39	17.21	31.15	27.05	8.20

Table V-28 *(continued)*

Package C	certainly not	probably not	not sure	probably yes	certainly yes
Drive my car less	13.11	22.95	24.59	23.77	15.57
Use public transport more often	9.84	10.66	29.51	27.87	22.13
Use bicycle/NMT/walk more	30.33	24.59	29.51	9.84	5.74
Join in car-sharing/ride-sharing programs	12.30	19.67	42.62	17.21	8.20
Pay charges and drive/park as usual	13.11	18.85	34.43	22.95	10.66
Support a movement to stop the strategy	22.95	24.59	25.41	14.75	12.30
Ask my office/family to reimburse my expenses on the charges	19.67	15.57	29.51	19.67	15.57
Support a movement to organize office-bus/school-bus	8.20	10.66	23.77	36.89	20.49

Regarding the preferred use of revenues, the following findings are revealed (Figure V-11). The respondents highly rate the posts where the mobility could be directly improved. These posts include traffic flow improvement, reduction of public transport fares, improvement of public transportation quality, and improvement of pedestrian and non-motorized transportation facilities. However, these expectations are not accompanied with high level of trust that the government would use the money as they expect.

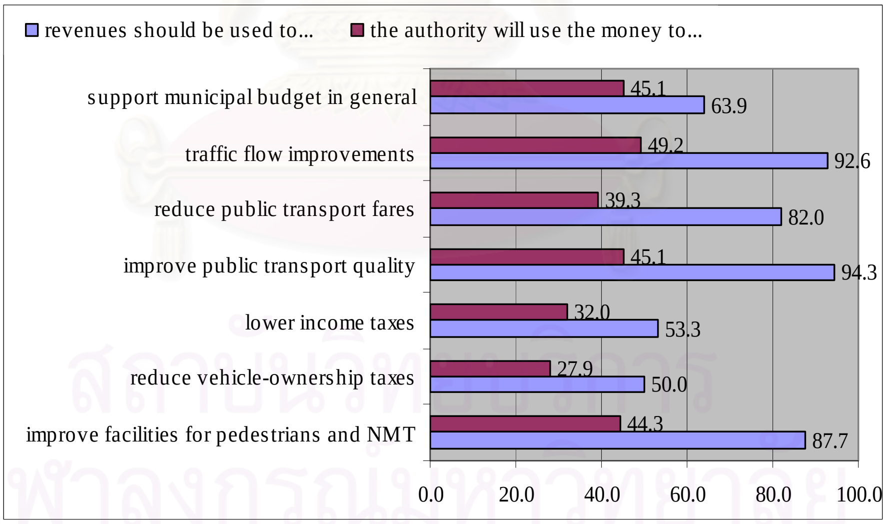


Figure V-11 Hypothetic revenue allocation (confirmative responses in %)

Compared with Bangkok sample, the persons interviewed in Jakarta indicate positive equity outcome expectations in general (Figure V-12). The results shown in the last two figures are encouraging in that they can be used to communicate pricing-based strategies in order to be more acceptable. The government should convince the motorists that the revenues collected from their money would be used as they expect.

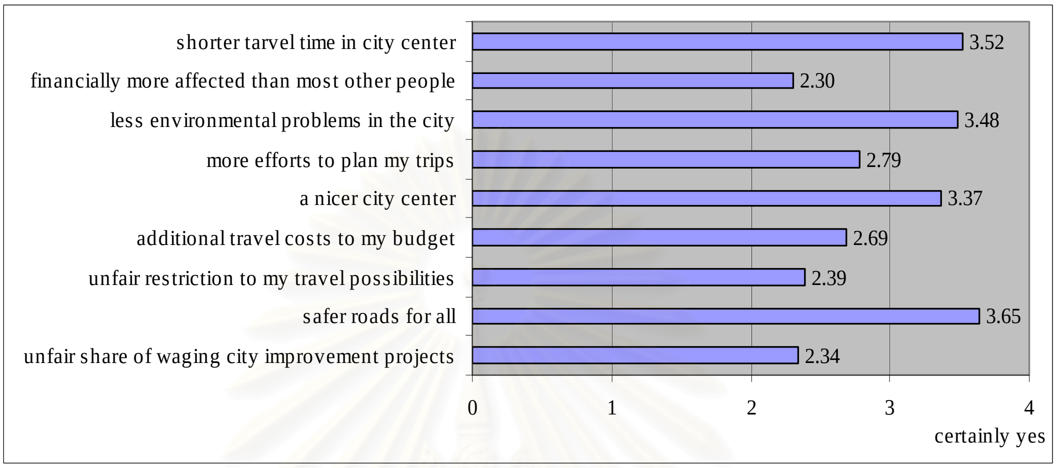


Figure V-12 Equity outcome expectations in the general case of price-based TDM policies

5.3.3 Kuala Lumpur

The Kuala Lumpur sample contains 151 persons, 56.95% men and 43.05% women. Compared with the other cities in this study, Kuala Lumpur features the lowest urban density and a very high car ownership. There has been no indication of restraint measures applied to curb the rapid rate of private motorization. In contrast, there is a widely known national car policy that provides easy schemes for its citizens to own private cars.

The Kuala Lumpur sample shows a differential perception of transportation problems as societal problem. Traffic congestion is perceived as the main general problem, followed by inadequate parking space and air pollution from motorized vehicles. However, the rates for these problems are noticeably lower than those of Bangkok and Jakarta. The other problems (inadequate public transportation, traffic noise, and unsafe roads) are less seen as a problem (Figure V-13).

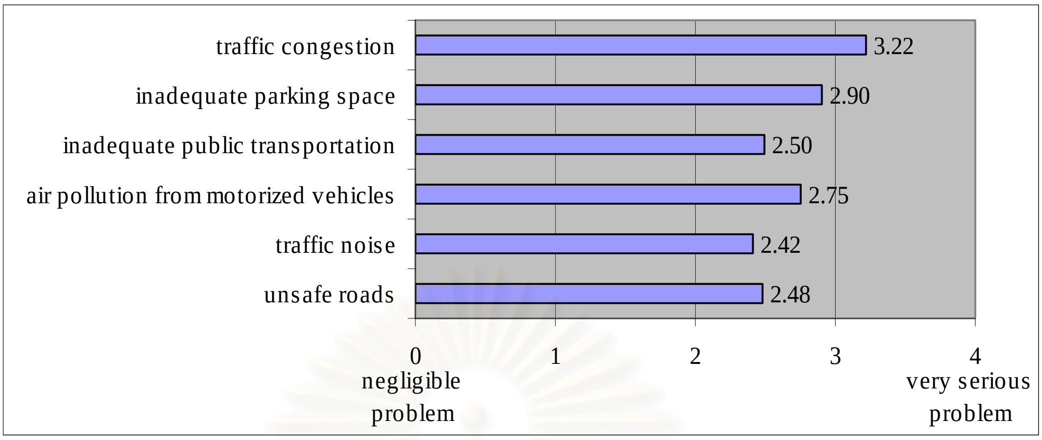


Figure V-13 General problem perception: mean values.

The personal problem perception does not differ substantially from the general problem perception (Table V-29). Three-fourth of the respondents feel personally affected by traffic congestion. Slightly more then a half indicate that they are affected by inadequate parking space, air pollution and unsafe roads. Consistent with the fact that there is a very high vehicle ownership, only 30% of the respondents feel that they are affected by inadequacy of public transportation services. This is, in fact, the lowest affectedness indicated in the survey.

Table V-29 Personal problem perception (affectedness in %)

	% of people seriously and very seriously affected
traffic congestion	74.17
inadequate parking space	56.95
inadequate public transportation	30.46
air pollution from motorized vehicles	52.32
traffic noise	46.36
unsafe roads	50.33

Compared with Jakarta, the Kuala Lumpur sample seems to be more optimistic in their expectation about the future state of the problems (Table V-30). However, a half of respondents indicate that traffic congestion, inadequate parking space, air pollution, and traffic noise will be worse in the next 5 years.

Table V-30 Problem expectation (in %)

	getting worse	stay the same	getting better
traffic congestion	58.28	19.21	22.52
inadequate parking space	59.60	21.85	18.54
inadequate public transportation	28.48	31.79	39.74
air pollution from motorized vehicles	53.64	27.15	19.21
traffic noise	49.01	31.79	19.21
unsafe roads	35.10	34.44	30.46

Despite the lesser level of problem perception compared with the two cities described previously, a majority of the persons asked in Kuala Lumpur are sure about the need to limit the amount of traffic volume (Table V-31).

Table V-31 A need to limit the traffic (in %)

not at all	not really	only slightly	to some extent	certainly
2.65	7.95	27.81	28.48	33.11

Figure V-14 shows the attribution of responsibility to the solution of transportation problems. Unlike the Jakarta sample, people asked in Kuala Lumpur attribute higher level of responsibility to external parties, such as the state, municipal government, bus companies and police officer. Meanwhile, they put the lowest responsibility to themselves and the motorists. These results tentatively indicate that there is only a low level of internal attribution of responsibility.

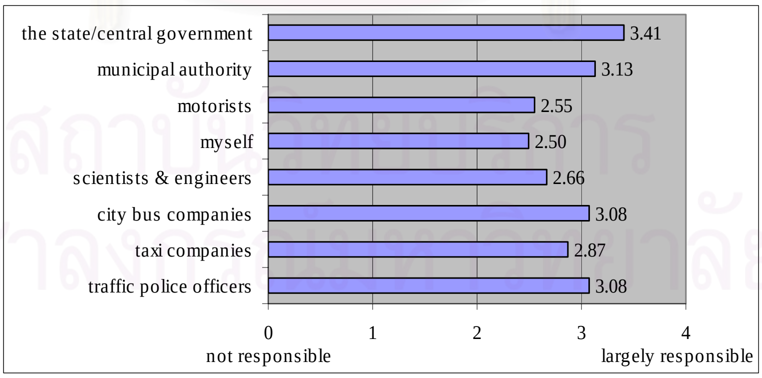


Figure V-14 Attribution of responsibility for the solution of perceived problems (mean)

As expected, there is only a little portion of the respondents who stated that it was not difficult for them to reduce car trips substantially (Table V-32). This is an anticipated response in a city where there is a high dependency of car use.

Table V-32 Perceived difficulty to reduce automobile trips substantially (in %)

not difficult at all	not really difficult	difficult to some extent	difficult	very difficult
5.30	7.95	31.79	28.48	26.49

Table V-33 shows the distribution of expectation whether driving in the future will become more expensive. Only slightly more than 5% of the respondents do not expect an increase in car costs.

Table V-33 Expectation that driving will be more expensive in the future (in %)

not at all	probably no	probably	almost certainly	certainly
0.66	4.64	20.53	31.13	43.05

As regards the anticipation of the personal effects when driving becomes more expensive, the respondents report the highest elasticities compared to the other cities. The lowest elasticity is reported for mandatory trips (Figure V-15).

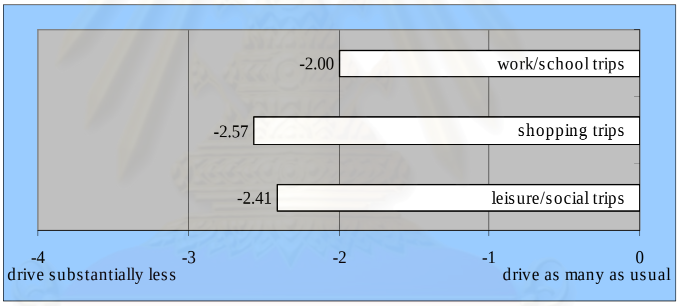


Figure V-15 Self reported elasticity of driving for various trip purposes when driving becomes more expensive (mean values)

Although there hardly found a concrete implementation of any restraint measure, the respondents of Kuala Lumpur are not strange to the proposed packages. The results reported in Table V-34 shows a somewhat similar trend with the evaluation made by the Jakarta sample in that they are particularly more familiar with Package *A*. Package *B* and *C* are less known to persons asked in Kuala Lumpur. However, there is a considerable minority of roughly 20% who stated that they knew a lot the two packages.

Table V-34 Information about the TDM Packages (in %)

	never heard at all	know a little	know somewhat	know a lot
Package A	12.58	15.23	31.79	40.40
Package B	41.06	15.23	23.18	20.53
Package C	37.75	19.87	21.85	20.53

The evaluation of the effectiveness of the three packages shows a different pattern across the package Table V-35. Almost 45% or the respondents say that Package *A* would at least have large effect. In the case of Package *B* and *C*, people who state as so are only 25% and 30%, respectively. A considerable percentage (30%, 38%, and 40% for Package *A*, *B*, and *C*, respectively) indicate that the proposed strategies will only have some effect.

Table V-35 Perceived effectiveness of the proposed Packages (in %)

	will not work at all	will have slight effect	will have some effect	will have large effect	will work very effectively
Package A	11.26	15.89	29.14	29.14	14.57
Package B	23.84	13.91	37.75	15.23	9.27
Package C	17.22	10.60	39.74	21.85	10.60

Regarding the outcome expectation (Table V-36), some people asked in Kuala Lumpur reflect neutral expectation. A considerable proportion who indicates that they are in neutral position has been a common finding in this study. Aside from this proportion, people in Kuala Lumpur tend to expect negative outcome. The most negative outcome is expected from Package *B*.

Table V-36 General Personal outcome expectation in the case of each Package (in %)

	disadvantaged	rather disadvantaged	no importance to me	rather advantaged	advantaged
Package A	17.88	21.19	28.48	23.84	8.61
Package B	23.84	23.18	35.76	13.91	3.31
Package C	23.18	18.54	35.76	16.56	5.96

In direct evaluation of the acceptability (Table V-37), again there is a considerable proportion of neutral favor indicated. Surprisingly, a noticeable minority of 22% claim that Package *C* (pricing-based measures) is rather acceptable. This is the highest rate of acceptability of Package *C* across the study area.

Table V-37 Acceptability of the proposed TDM Policy Package (in %)

	absolutely unacceptable	rather unacceptable	neither unacceptable nor acceptable	rather acceptable	totally acceptable
Package A	13.25	19.21	37.09	22.52	7.95
Package B	23.18	19.87	37.09	15.89	3.97
Package C	13.25	25.83	33.11	21.85	5.96

Table V-38 Perceived social pressure to accept the proposed Packages (in %)

	very unlikely	rather unlikely	neither unlikely nor likely	rather likely	very likely
Package A	16.56	15.89	34.44	20.53	12.58
Package B	25.83	15.89	39.74	14.57	3.97
Package C	17.88	21.19	39.07	15.23	6.62

As regards to the evaluation of the social norm, the distributions closely resemble that of the acceptability (Table V-38).

Table V-39 Expressed intentions in the case of Package *A*, *B*, and *C* (in %)

Package A	certainly not	probably not	not sure	probably yes	certainly yes
Drive my car less	7.28	15.89	23.18	37.09	16.56
Use public transport more often	6.62	12.58	25.17	27.15	28.48
Use bicycle/NMT/walk more	26.49	17.22	28.48	20.53	7.28
Join in car-sharing/ride-sharing programs	17.88	22.52	29.14	20.53	9.93
Try to fill extra passengers into my car where the access restriction is imposed	17.88	21.19	33.77	20.53	6.62
Avoid driving the routes where the access restriction is imposed	6.62	5.96	32.45	31.79	23.18
Park inside restriction area and pay parking charge	13.91	16.56	35.76	26.49	7.28
Support a movement to stop the strategy	31.13	19.87	31.79	13.25	3.97
Park my car beyond the restricted area and use public transport to travel within that area	7.95	9.27	21.85	24.50	36.42
Package B					
Drive my car as usual whenever the access is granted	11.26	14.57	29.14	18.54	26.49
Use public transport more often	5.30	12.58	32.45	24.50	25.17
Use bicycle/NMT/walk more	22.52	18.54	33.11	15.23	10.60
Drive less even during days permitted to drive	15.23	18.54	39.07	13.91	13.25
Join in car-sharing/ride-sharing programs	19.87	20.53	33.11	17.88	8.61
Buy second car so I can drive more	47.02	12.58	25.83	7.95	6.62
Park my car as usual (within the restricted area) during the days permitted to drive	13.25	16.56	39.07	11.92	19.21
Support a movement to stop the strategy	29.14	14.57	38.41	12.58	5.30
Park my car beyond the restricted area and use public transport to travel within that area	10.60	9.27	32.45	25.83	21.85
Package C					
Drive my car less	8.61	15.89	31.79	21.85	21.85
Use public transport more often	5.96	14.57	29.80	29.80	19.87
Use bicycle/NMT/walk more	23.84	19.21	30.46	19.87	6.62
Join in car-sharing/ride-sharing programs	17.22	23.18	31.13	19.87	8.61
Pay charges and drive/park as usual	19.21	18.54	37.75	13.91	10.60
Support a movement to stop the strategy	31.79	16.56	31.79	12.58	7.28
Ask my office/family to reimburse my expenses on the charges	5.30	7.95	29.80	20.53	36.42
Support a movement to organize office-bus/school-bus	4.64	9.27	25.83	24.50	35.76

Table V-39 examines the expressed intentions if each of the policy packages were to be introduced. Intentions are not always consistent with revealed behaviors. Nevertheless, they could provide a hint of possible induced behaviors.

In the case of the most acceptable package, i.e. Package *A*, there seems to be a general intention to behave accordingly with the proposed policies. Slightly more than a half of respondents express their intention to drive less and use public transportation more often. There is also a willingness to modify car use behavior by avoiding the routes where the restraint measure is imposed and by making use of park and ride services. In addition, only less than 20% indicate that they would oppose the measures by supporting a movement to stop them.

In the case of Packages *B* and *C*, there is also indicated an intention to drive less and use public transportation more often, only not as apparent as in the previous case. In particular with Package *C*, it is interesting that more than 50% of the persons asked show an intention to externalize the imposed extra charges to their offices or families if it were possible. Support to organize staff and school buses is also indicated by majority of the respondents.

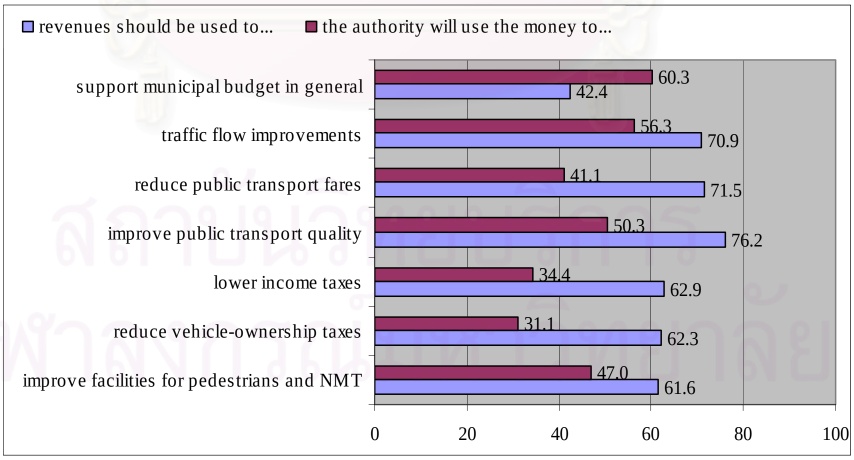


Figure V-16 Hypothetic revenue allocation (confirmative responses in %)

Looking further into Figure V-16 where hypothetic revenue allocations are evaluated, the highest three posts rated by the Kuala Lumpur sample are public transport quality improvement, fare reduction, and traffic flow improvement.

However, these are not confirmed by as many people (in proportion) as in the Jakarta sample.

Another interesting result shown in Figure V-16 is in the allocation for municipal general budget. Only less than a half of the respondents think that the revenues should be put in this post, in contrast to a majority belief that the authority would flow the revenues to support general budget. Also, in a city where national car policy is fully supported by the government, there is still a considerable hope to make use the revenues collected from pricing-based TDM measures to reduce vehicle ownership taxes.

Figure V-17 Equity outcome expectations in the general case of price-based TDM policies

Lastly, Figure V-17 shows a detailed intrapersonal outcome expectation in the case where the respondents were to pay more for driving. As indicated, both positive and negative outcomes are almost equally anticipated.

5.3.4 Manila

The Manila sample is the largest compared with the other cities. It contains 219 persons, 68.5% men and 31.5% women. In Manila, a famous car use restraint measure based on the last number of car's plate-license has been widely adopted for nine years. In this study, this particular measure is incorporated in Package *B*, together with public transportation improvement and increased parking charge.

In this city, the two-most frustrating transportation problems seen as societal problems are traffic congestion and air pollution from motor vehicles (Figure V-18). Unsafe roads are also considered serious. Other problems, including inadequate public transportation, are rated less seriously. This supports the fact that in Manila, there available abundant paratransit services.

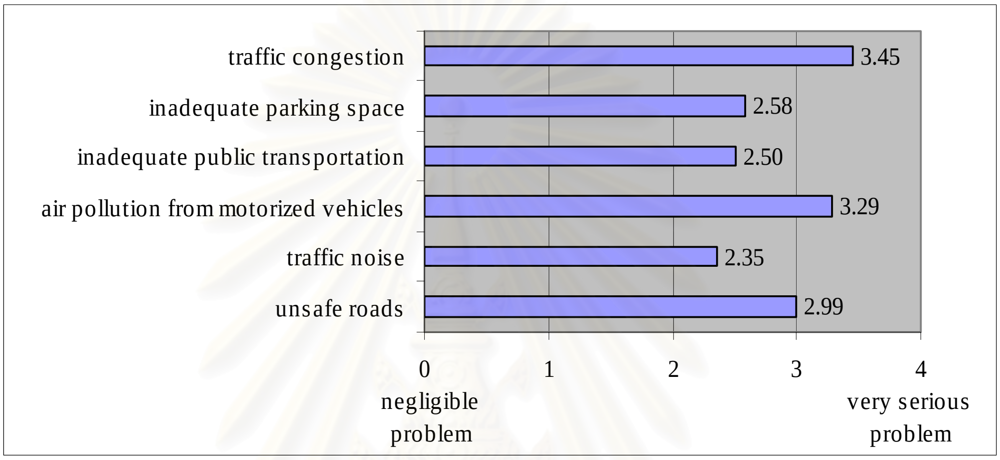


Figure V-18 General problem perception: mean values.

The patterns of personal problem perception (Table V-40) seem to follow a similar trend with general problem perception. Roughly 80% of the interviewees are affected by traffic congestion and air pollution problems. In the third place is unsafe road problem, with 68% of affectedness.

Table V-40 Personal problem perception (affectedness in %)

	% of people seriously and very seriously affected
traffic congestion	83.1
inadequate parking space	55.0
inadequate public transportation	39.7
air pollution from motorized vehicles	78.1
traffic noise	43.1
unsafe roads	67.6

As regards with the problem development (Table V-41), the Manila sample generally expects the problems to be worse in the next 5 years. However, a noticeable minority of 30% state than inadequacy of public transportation and unsafe roads will be getting better.

Table V-41 Problem expectation (in %)

	getting worse	stay the same	getting better
traffic congestion	69.41	16.44	14.16
inadequate parking space	60.73	21.46	17.81
inadequate public transportation	44.29	27.85	27.85
air pollution from motorized vehicles	74.43	10.96	14.61
traffic noise	52.05	34.25	13.70
unsafe roads	44.75	25.57	29.68

The people asked in Manila are generally certain about the need to limit the traffic on the city's road network (Table V-42). Slightly less than 80% of the respondents indicate the importance of such a need, at least to some extent. However, this does not consider how to obtain the reduction.

Table V-42 A need to limit the traffic (in %)

not at all	not really	only slightly	to some extent	certainly
1.37	2.74	16.89	30.59	48.40

The following (Figure V-19) depicts how the respondents in Manila attribute the responsibility to the solution of transportation problems. All parties are generally attributed as largely responsible, except the planners (scientists and engineers) and themselves. The latter result seems to indicate a low self-attribution of responsibility. However, the respondents regard the motorists, which can be considered an internal entity, with a considerable responsibility.

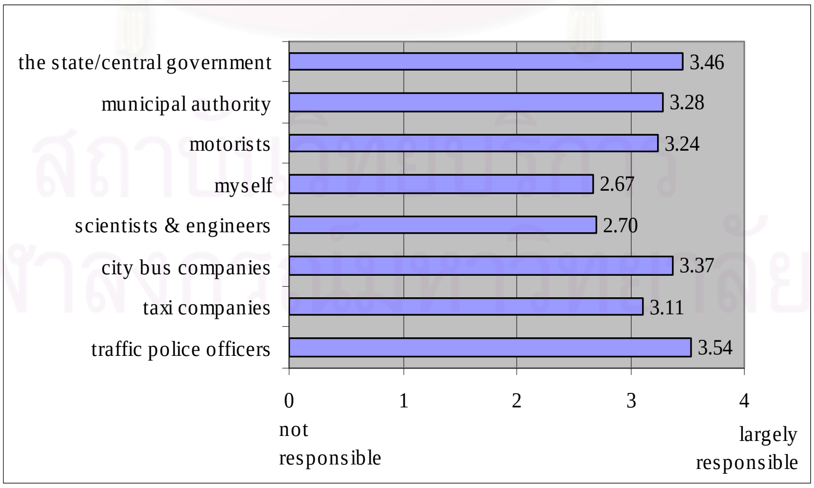


Figure V-19 Attribution of responsibility for the solution of perceived problems (mean)

Concerning the perceived dependency on car use, 85% of the persons asked report that it would be difficult, at least to some extent, for them to reduce car trips substantially (Table V-43).

Table V-43 Perceived difficulty to reduce automobile trips substantially (in %)

not difficult at all	not really difficult	difficult to some extent	difficult	very difficult
2.74	14.61	35.16	32.42	15.07

On the other hand, almost all of the persons asked expect that driving will become more expensive in the future (Table V-44).

Table V-44 Expectation that driving will be more expensive in the future (in %)

not at all	probably no	probably	almost certainly	certainly
0.00	3.67	11.93	37.16	47.25

However, given the almost certain expectation, the people of the Manila sample altogether state a very low elasticity concerning a reduction of personal trips. For mandatory trips and shopping trips little effects are expected. As for the social/leisure trips respondents are more willing to reduce driving.

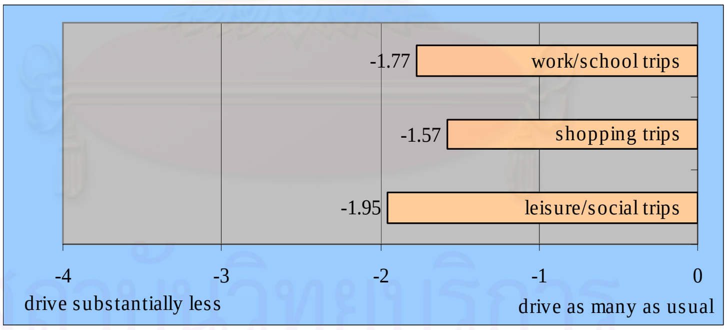


Figure V-20 Self reported elasticity of driving for various trip purposes when driving becomes more expensive (mean values)

The first evaluation asked about the proposed policy packages is respondent's subjective knowledge (Table V-45). The results show that Package *B* is very famous among the people of Manila sample. This is to be expected, since the package contains a restraint measure that has been imposed in Manila for years. Package *C* that contains pricing-based measures is known the least to the respondents.

Table V-45 Information about the TDM Packages (in %)

	never heard at all	know a little	know somewhat	know a lot
Package A	31.05	22.83	22.83	23.29
Package B	18.26	10.50	17.35	53.88
Package C	55.96	21.56	15.14	7.34

Regarding the evaluation of the effectiveness of the proposed packages (Table V-46), more than a half of the Manila sample state that Package *B* will have large effect or will work very effectively. This considerable support is apparently consistent to their subjective knowledge about the packages in that the most familiar package is also rated the most effective. The second rank in terms of perceived effectiveness in Package *A*, while the relatively unknown Package *C* is rated the least effective.

Table V-46 Perceived effectiveness of the proposed Packages (in %)

	will not work at all	will have slight effect	will have some effect	will have large effect	will work very effectively
Package A	5.94	12.33	34.70	37.90	9.13
Package B	3.20	10.96	31.05	42.01	12.79
Package C	17.81	21.46	32.42	18.72	9.59

The Manila sample is apparently so convinced by Package *B*. In their evaluation of general personal outcome expectation (Table V-47), slightly more than 40% of the people asked state that they are, at least, rather advantaged by Package *B*. This is, in fact, the most optimistic rate of expectation among the cities considered in this study. As for Package *A*, a considerable proportion of the respondents also expect to be at least rather advantaged. In contrast, Package *C* is rated at least rather disadvantaged by almost a half of the respondents.

Table V-47 General personal outcome expectation in the case of each Package (in %)

	disadvantaged	rather disadvantaged	no importance to me	rather advantaged	advantaged
Package A	16.44	15.53	30.14	26.03	11.87
Package B	6.85	7.31	43.84	31.96	10.05
Package C	22.37	26.94	29.22	15.53	5.94

When it comes to evaluate the level of acceptability of the three packages, similar trends to those of the previous evaluations are noticed (Table V-48).

Package *B* is rated rather acceptable or totally acceptable by more than 50% of the respondents. In contrast, Package *C* is rated rather unacceptable or totally unacceptable also by more than a half of the sample. As for Package *A*, acceptability evaluation tends to be balanced between acceptable and unacceptable sides despite a considerable proportion who state a neutral favor.

Table V-48 Acceptability of the proposed TDM Policy Package (in %)

	absolutely unacceptable	rather unacceptable	neither unacceptable nor acceptable	rather acceptable	totally acceptable
Package A	8.22	26.48	38.81	22.83	3.65
Package B	5.02	8.22	31.96	37.44	17.35
Package C	25.57	25.11	26.48	16.89	5.94

The similar patterns continue to show up in the evaluation of perceived social pressure to accept the proposed packages (Table V-49).

Table V-49 Perceived social pressure to accept the proposed Packages (in %)

	very unlikely	rather unlikely	neither unlikely nor likely	rather likely	very likely
Package A	13.70	17.35	30.14	28.31	10.50
Package B	6.39	10.50	31.96	37.90	13.24
Package C	26.03	26.03	26.48	15.98	5.48

The next table shows some expressed intentions due to the application of each policy package (Table V-50). Even though there always a considerable proportion who are not sure of whether they would do a particular action, there seems to be a tendency to behave according to the measures.

Table V-50 Expressed intentions in the case of Package *A*, *B*, and *C* (in %)

Package A	certainly not	probably not	not sure	probably yes	certainly yes
Drive my car less	8.68	11.42	24.20	36.53	19.18
Use public transport more often	7.76	10.50	31.05	30.14	20.55
Use bicycle/NMT/walk more	29.68	20.09	27.40	17.81	5.02
Join in car-sharing/ride-sharing programs	7.37	13.82	35.02	27.65	16.13
Try to fill extra passengers into my car where the access restriction is imposed	13.76	19.27	35.78	19.72	11.47
Avoid driving the routes where the access restriction is imposed	1.38	5.50	31.19	31.65	30.28
Park inside restriction area and pay parking charge	14.16	19.63	38.81	18.26	9.13

Table V-50 *(continued)*

Package A	certainly not	probably not	not sure	probably yes	certainly yes
Support a movement to stop the strategy	21.46	27.40	36.07	10.50	4.57
Park my car beyond the restricted area and use public transport to travel within that area	10.96	11.87	31.51	27.40	18.26
Package B					
Drive my car as usual whenever the access is granted	3.65	6.39	23.29	30.59	36.07
Use public transport more often	7.76	13.24	31.51	31.51	15.53
Use bicycle/NMT/walk more	29.36	22.48	27.52	15.60	5.05
Drive less even during days permitted to drive	11.47	17.43	34.86	25.23	11.01
Join in car-sharing/ride-sharing programs	6.91	22.58	29.49	24.42	16.59
Buy second car so I can drive more	33.89	13.33	20.56	17.22	15.00
Park my car as usual (within the restricted area) during the days permitted to drive	7.31	14.61	31.96	29.22	16.89
Support a movement to stop the strategy	30.88	25.81	29.95	8.29	5.07
Park my car beyond the restricted area and use public transport to travel within that area	12.39	10.55	36.24	24.77	16.06
Package C					
Drive my car less	8.72	12.84	26.61	25.69	26.15
Use public transport more often	6.39	12.79	21.46	30.14	29.22
Use bicycle/NMT/walk more	29.22	20.09	24.66	16.44	9.59
Join in car-sharing/ride-sharing programs	9.59	21.46	29.68	21.92	17.35
Pay charges and drive/park as usual	15.07	24.66	31.96	19.63	8.68
Support a movement to stop the strategy	21.92	22.83	26.03	17.81	11.42
Ask my office/family to reimburse my expenses on the charges	11.01	10.09	27.52	24.31	27.06
Support a movement to organize office-bus/school-bus	7.34	11.93	36.70	22.48	21.56

More people state that they would probably or certainly drive car less and use public transportation services more often. Car sharing or ride sharing programs and staff/school buses are also considered an alternative to private cars. However, park ride scheme seems to be not too interesting to the motorists. Non-motorized transportation services also remain implausible. In addition, generally the sample states negative intention concerning to support movement to stop the strategies if they were imposed.

Further results report the expectation on how the revenues collected from pricing-based TDM strategies should be spent (Figure V-21). The top priorities rated by the respondents are: improving public transportation quality (87%), reducing public transportation fares (72%), and improving traffic flow (88%). These results reflect a general expectation to channel the revenues collected from transportation sector back to transportation sector. From the perception of the respondents, however, this general hope is considerably unsupported by the government's current policy.

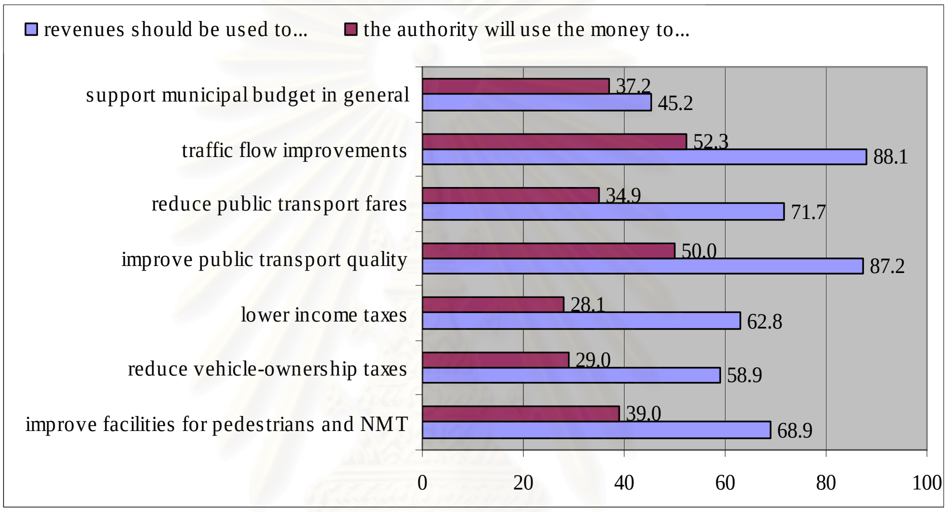


Figure V-21 Hypothetic revenue allocation (confirmative responses in %)

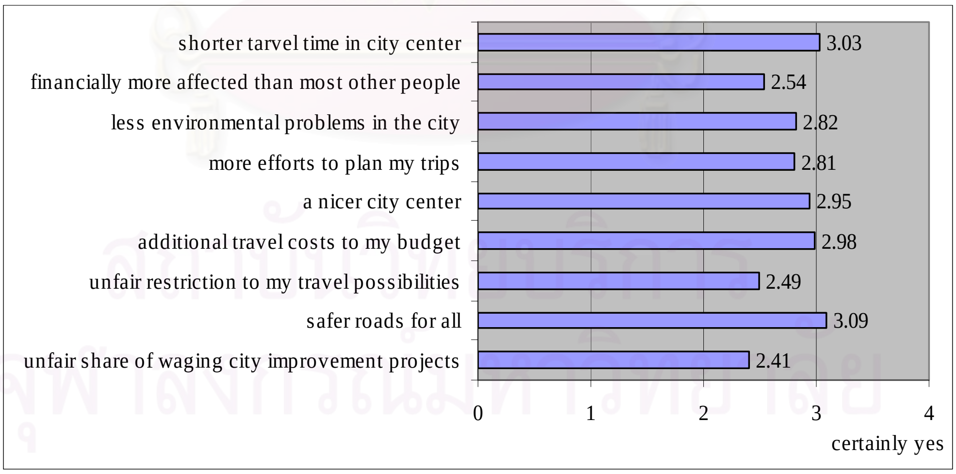


Figure V-22 Equity outcome expectations in the general case of price-based TDM policies

The last figure depicts the intrapersonal equity outcome expectations in the case of price-based TDM policies. Figure V-22 shows that the respondents generally evenly expect the positive and negative outcomes. For instance, the positive outcomes such as shorter travel time in the city center and safer road network are only rated slightly higher to the negative outcomes such as additional travel costs to one's budget and more efforts to plan one's trips.

5.4 SITE FOR SITE RESULTS

In the following section, results of the four cities will be compared with respect to the main measured variables of the public acceptability. Mostly, frequency distributions and mean values will be reported.

Table V-51 General problem perception – confirmative response (%)

Problems	General problem perception				
	Total	Bangkok	Jakarta	Kuala Lumpur	Manila
traffic congestion	90	96	91	83	88
inadequate parking spaces	67	75	62	72	58
inadequate public transportation	63	81	68	51	52
air pollution from motor vehicles	82	95	87	64	80
traffic noise	59	76	67	52	44
unsafe roads	72	88	72	52	71

Table V-51 shows the percentage of respondents by sites who rated the transportation problems as a 'serious problem' or a 'very serious problem' (scale 3 or 4). In Bangkok, all items are rated as problematic by nearly all respondents. Jakarta also perceives high problem awareness. However, all the items are rated as less serious than in Bangkok. Both Kuala Lumpur and Manila samples feature lower problem perception as compared to Bangkok and Jakarta. There is apparently a similar pattern in general problem-perception between cities in that the two-most pressing problems perceived by a vast majority of the respondents are *traffic congestion* and *air pollution from motor vehicles*. The only exception is in the case of Kuala Lumpur, where more people perceive inadequate parking spaces as more problematic than air pollution from motor vehicles. These results imply that beside traffic related problems, the motorists asked during the survey also perceive traffic induced environmental problems.

Responses to question whether car traffic should be limited show a similar high rating (Table V-52). At least two-third of the respondents in each city indicate that car traffic certainly or to some extent needs to be restricted.

Table V-52 A need to limit the traffic? (confirmative responses in %)

Total	Bangkok	Jakarta	Kuala Lumpur	Manila
72	63	86	62	79

Further analysis reveals that there are different types of correlation between problem perception and support for traffic limitations between the four cities (Table V-53). Generally, all problem perceptions (mobility–environmental, personal–societal), have positive correlations with support for traffic limitations, although their level of significance vary between cities. A special case is found in Bangkok sample, where the perception of rather environmental problems, either from personal or societal points of view, leads to negative correlations with support for traffic limitations.

Table V-53 Correlations between problem perceptions and support for traffic limitations

Correlations (r)		Personal problem perception		Societal problem perception	
		Mobility	Environmental	Mobility	Environmental
A need to limit vehicle traffic	Bangkok	.2781 p=.000	-.2493 p=.000	.3812 p=.000	-.2559 p=.000
	Jakarta	.1696 p=.062	.1470 p=.106	.2078 p=.022	.0876 p=.338
	Kuala Lumpur	.0908 p=.267	.1742 p=.032	.2019 p=.013	.2266 p=.005
	Manila	.1569 p=.021	.0920 p=.178	.2466 p=.000	.0780 p=.253

mobility and *environmental* problem perceptions are extracted from problem perception variables using factor analysis (Chapter VI). Individual scores for the two problem perceptions are subsequently calculated with regression method.

The following table (Table V-54) summarizes the descriptive results (mean values) for the evaluation of the three proposed packages. As can be seen from the total sample as well as from the site specific samples, the lowest level of subjective information is toward Package *C*. This is not surprising, because road pricing strategy which constitutes Package *C* is rather new among the respondents in the study area.

Regarding the effectiveness-evaluation of the proposed packages to the reduction of inner city traffic, each sample seems to have a unique pattern. In Bangkok, tough Package *C* is less known to the other two packages, it is rated more effective. In Jakarta, the already-known Package *A* is perceived as the most effective package. The same package is also rated the first place in Kuala Lumpur. Both respondents in Jakarta and Kuala Lumpur regard Package *C* and *B* as less and the least effective package, respectively. Only in Manila, Package *B* is rated the most effective.

Table V-54 Overall evaluations of Package *A*, *B*, and *C* (mean).

	Package	Information	Perceived effectiveness	Personal outcome expectations	Acceptability
Bangkok	A	1.90	1.98	-0.39	-0.04
	B	1.19	1.85	-0.53	-0.38
	C	0.95	1.98	-0.51	-0.33
Jakarta	A	1.84	1.97	0.08	-0.07
	B	1.64	1.41	-0.52	-0.54
	C	0.84	1.47	-0.66	-0.44
Kuala Lumpur	A	2.18	2.20	-0.16	-0.07
	B	1.30	1.72	-0.50	-0.42
	C	1.30	1.98	-0.36	-0.19
Manila	A	1.48	2.32	0.01	-0.13
	B	2.42	2.50	0.31	0.54
	C	0.77	1.81	-0.44	-0.47
Total sample	A	1.82	2.13	-0.13	-0.08
	B	1.68	1.95	-0.26	-0.13
	C	0.95	1.84	-0.48	-0.36

Mean values for *information* and *perceived effectiveness* can vary from 0 (i.e. never heard, will not work at all) to 4 (i.e. know a lot, work very effectively). Mean values for *personal outcome expectation* and *acceptability* can vary from -2 (i.e. disadvantaged, totally unacceptable) to 2 (advantaged, totally acceptable).

Concerning the personal outcome expectations, it can be seen that the respondents generally expect to be disadvantaged by all packages. The samples of Bangkok and Kuala Lumpur expect to be most disadvantaged by Package *B*, while Jakarta and Manila respondents anticipate more disadvantages from Package *C*. However, there are slight expectations to be advantaged by Package *A* in Jakarta and Manila. In particular, Package *B* is rated benefiting by respondents in Manila.

The last column of Table V-54 deals with acceptability evaluation. As indicated, all mean values for the evaluation of acceptability are negative, expect for one case: acceptability of the locally famous Package *B* by the respondents in Manila. This fact is interesting in particular, because in all other cities Package *B* is rather the most unacceptable solution among the three proposed packages. In addition to the last column of Table V-54, the following Table V-55 shows the percentages of respondents in each city who rate the packages as rather acceptable or totally acceptable (scale 3 or 4). All packages are hence generally rejected by the respondents, except for the aforesaid case.

Table V-55 Acceptability (% who rate the package as rather or totally acceptable)

	Acceptability				
	Total	Bangkok	Jakarta	Kuala Lumpur	Manila
Package *A*	25	20	26	30	26
Package *B*	29	14	16	20	55
Package *C*	23	20	20	28	23

Finally, Table V-56 below summarizes Kruskal-Wallis non-parametric ANOVA tests that were performed to find out whether the aspects under interest, i.e. information, perceived effectiveness, personal outcome expectation, and acceptability were rated significantly differently between the cities. As shown, the low *p*-values ($p<.05$) indicated in most cases imply that these aspects had been rated differently across places, at least between two out of four cities. However, the ratings are not significantly different between cities in the cases of personal outcome expectation of Package *C*, and acceptability of Packages *A* and *C*.

Table V-56 Summary of Kruskal-Wallis non-parametric ANOVA tests

	Package A	Package B	Package C
Information	H =27.79485 p =.0000	H=87.83738 p =.0000	H =19.67476 p =.0002
Perceived effectiveness	H=16.72153 p =.0008	H=91.98442 p =0.000	H =16.89635 p =.0007
Personal outcome expectation	H=16.30154 p =.0010	H=85.19419 p =.0000	H =4.228943 p =.2378
Acceptability	H=.6073226 p =.8948	H=113.3997 p =0.000	H=6.799610 p =.0786

N=691. No of groups = 4.

The foregoing chapter has presented descriptive figures about the issues related to the acceptability of TDM strategies, particularly the three packages specified in this study. To analyze further the relations between the different variables, statistical investigations on a multivariate basis are necessary to be carried out.

Chapter VI
Statistical Models for Acceptability of TDM

6.1 INTRODUCTION

This chapter employs multivariate statistical methods to provide answer for research questions posted in the first chapter, particularly question number 3 and 4, which ask: how the current (i.e., low) level of acceptability of TDM strategies can be explained; and, which factors influence the level of acceptability. For this, three methods have been chosen. Firstly, the extensive data will be reduced into an appropriate minimum by using factor analysis technique. Secondly, regression analysis is applied to investigate which variables contribute to the explanation of acceptability. Ordered probit regression has been particularly chosen (Bhattacharjee et al, 1996; Washington et al, 2003) for it suits the ordinal nature of the dependent variable (i.e. acceptability). Thirdly, an attempt is carried out to further investigate the complex relationships among many different variables by means of Structural Equation Model.

6.2 FACTOR ANALYSIS

As noted previously, some psychological aspects considered to play role in one's evaluation of acceptability toward the proposed TDM policies were measured via sets of manifest variables. These aspects include problem perception or awareness (societal and personal), one's important mobility aims to reach, attribution of responsibility for the solution of problems. There are also some variables to measure one's behavioral intentions with respect to the proposed strategies. Factor analysis is performed upon these aspects with twofold objectives: to find a set of factors that could represent the data and, at the same time, could be interpreted meaningfully in psychological context. The factor analysis was carried out for the total sample. In all cases, the principal components extraction method and varimax rotation were used. The results, as calculated using computer program SPSS 11.5, are reported in what follows.

Table VI-1 Factor model for Societal Problem Perception

Manifest variable	Factor loadings		Communalities
	1	2	
Traffic jam	0.158	**0.793**	0.654
Inadequate parking spaces	0.184	**0.781**	0.643
Inadequate public transportation	0.299	**0.584**	0.431
Air pollution from motor vehicles	**0.796**	0.237	0.690
Traffic noise	**0.818**	0.202	0.710
Unsafe roads	**0.794**	0.225	0.681

Eigenvalues for Factor 1 and Factor 2 are 2.896 and 0.912, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.78, scale 2 r = 0.61. Total variance explained: 63.46%

Table VI-1 shows a factor model for societal problem perception. Two factors were successfully extracted with reasonably high percentage of total variance explained. Considering the variables that load the factors, Factors 1 and 2 could reasonably be interpreted as *environmental problem perception* and *mobility problem perception*, respectively. Individual scores for Factor 1 and Factor 2, and all other factors extracted during this step of analysis, are accordingly calculated using regression method. These scores will serve the next steps of analysis.

Table VI-2 Factor model for Personal Problem Perception

Manifest variable	Factor loadings		Communalities
	1	2	
Traffic jam	0.233	**0.788**	0.675
Inadequate parking spaces	0.158	**0.845**	0.738
Inadequate public transportation	**0.701**	0.191	0.529
Air pollution from motor vehicles	**0.836**	0.123	0.714
Traffic noise	**0.845**	0.169	0.742
Unsafe roads	**0.654**	0.325	0.534

Eigenvalues for Factor 1 and Factor 2 are 2.979 and 0.954, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.79, scale 2 r = 0.58. Total variance explained: 65.54%

Table VI-2 depicts a factor model for personal problem perception. Again, two factors that can be interpreted as *environmental* and *mobility* problem perceptions had been created. However, it is to note that ‘inadequate public transportation’ now loads high onto environmental factor, instead of mobility factor. This is reasonable since it is seen from *a motorist’s* personal perception.

Table VI-3 reports a factor model for attribution of responsibility to solve the problems. Initially, it was assumed that this aspect would have two dimensions, i.e. external and internal attributions. It is further assumed that if one has a high score for such an internal attribution, it is expected that he or she would feel that personal contribution is also important to relief congestion problems, and hence be more willing to accept TDM measures and behave accordingly. However, a model with two factors for this particular case was not successful. Therefore, a modification was attempted and a model with three factors (as reported in Table VI-3) results. Extracted factors 1, 2 and 3 can be respectively interpreted as attribution to *planners, other users, and regulators,* attribution to *policy makers,* and *internal* attribution (to one's self and motorists).

Table VI-3 Factor model for Attribution of Responsibility to Solve the Problems

Manifest variable	Factor loadings			Communalities
	1	2	3	
The state	0.257	**0.836**	0.004	0.764
Municipal authority	0.104	**0.826**	0.275	0.769
Motorists	0.307	0.263	**0.697**	0.650
You (yourself)	0.045	0.017	**0.878**	0.772
Engineers and scientists	**0.429**	0.155	0.422	0.386
City bus companies	**0.877**	0.113	0.192	0.819
Taxi companies	**0.877**	0.103	0.155	0.804
Police/traffic officers	**0.689**	0.312	0.088	0.579

Eigenvalues for Factor 1, Factor 2, and Factor 3 are 3.451, 1.065 and 1.027, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.78, scale 2 r = 0.67, scale 3 r = 0.53. Total var. explained: 69.29%

The following Table VI-4 deals with factor model for one's important aims to reach in connection with traveling in the city. Two factors with eigenvalues higher than 1 were extracted. The total variance explained is only a bit lower than 50%, which is not surprising because of both, heterogeneity of the underlying items and of the four different city samples.

Table VI-4 Factor model for One's Important Aims to Reach

Manifest variable	Factor loadings		Communalities
	1	2	
I want to use my car whenever I like	0.086	**0.835**	0.705
Air quality in my city should be better	**0.675**	0.142	0.475
I want to go by car to any place I want	0.146	**0.831**	0.711
Traveling in the city should be cheap	**0.667**	0.013	0.445
All transport users should be treated equally	**0.684**	-0.106	0.479
I want to be by myself if I go by car	-0.136	**0.649**	0.439
Traffic safety should be imporoved	**0.693**	-0.041	0.481
I want to travel in the city regardless which mode I use	**0.500**	0.067	0.255

Eigenvalues for Factor 1 and Factor 2 are 2.201 and 1.790, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.63, scale 2 r = 0.67. Total variance explained: 49.89%
Two manivest variables concering with non-motorized mobility were excluded

Considering the variables that load highly onto a particular factor, the two factors extracted can be interpreted as follows. The first factor apparently represents general social mobility aims, whereas the second factor can be interpreted as one's 'car use' aims. The later may represents one's captivity or dependency toward car use. Based on these results, it can be hypothesized in particular that if one's score for the first factor is high, it will be more likely for him/her to support TDM in general because TDM values that seek to support sustainable mobility are in line with his/her valued aims. On the contrary, if one's score for 'car use' factor is rather higher, it is more unlikely that he/she would support car restriction measures since these TDM measures would be seen as infringement to his/her freedom to use car the way he/she likes.

Furthermore, the underlying structure of the indicated intentions if a policy package were to be introduced is examined (Tables VI-5 to VI-7). Two factors which can be interpreted meaningfully were created for each of the proposed packages. The first factor can be interpreted as intentions to reduce car use and/or to switch to other modes, whereas the second factor may be understood as intentions to maintain the current car use, at least in a modified manner. However, not all the results are satisfying. The second factor of Package *C*, for example, features extremely low reliability.

Table VI-5 Factor model for Behavioral Intentions in the case of Package *A*

Manifest variable	Factor loadings		Communalities
	1	2	
Drive car less	**0.780**	0.216	0.655
Use public transportation more often	**0.836**	0.118	0.713
Use bicycle or walk more	**0.729**	0.075	0.537
Fill in extra passengers and drive as usual in the restricted	0.158	**0.708**	0.526
Avoid driving the restricted routes	0.179	**0.593**	0.384
Park in the restricted area as usual and pay the charge	0.061	**0.758**	0.578
Park my car outside restriction area and take transit mode to travel within the area	**0.476**	0.369	0.362

Eigenvalues for Factor 1 and Factor 2 are 2.679 and 1.077, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.67, scale 2 r = 0.51. Total variance explained: 53.66%

In addition to discovering the underlying structure of indicated intentions, investigation is also performed to examine its connection with the acceptability evaluation. The results of this investigation are reported in Table VI-8.

Table VI-6 Factor model for Behavioral Intentions in the case of Package *B*

Manifest variable	Factor loadings 1	Factor loadings 2	Communalities
Drive as usual whenever the access is granted	0.083	**0.747**	0.564
Use public transportation more often	**0.767**	-0.126	0.605
Use bicycle or walk more	**0.728**	0.067	0.535
Drive less even when access is granted	**0.660**	0.092	0.444
Join car-pooling/car-sharing programs	**0.694**	0.201	0.522
Buy a second car so as to allow me drive more	0.023	**0.631**	0.399
Park my car as usual in the restricted area when access is granted	0.013	**0.830**	0.689
Support a movement to stop the policy	-0.100	**0.023**	0.011
Park my car outside restriction area and take transit mode to travel within the area	**0.534**	0.287	0.368

Eigenvalues for Factor 1 and Factor 2 are 2.544 and 1.592, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.72, scale 2 r = 0.44. Total variance explained: 45.96%

Table VI-7 Factor model for Behavioral Intentions in the case of Package *C*

Manifest variable	Factor loadings 1	Factor loadings 2	Communalities
Drive less	**0.781**	-0.223	0.659
Use public transportation more often	**0.827**	-0.173	0.713
Use bicycle or walk more	**0.726**	0.189	0.563
Join car-pooling/car-sharing programs	**0.674**	0.219	0.502
Pay charges and drive/park as usual	-0.151	**0.626**	0.414
Support a movement to stop the policy	0.007	**0.619**	0.383
Have my office/family reimburse my expenses on the charges	0.320	**0.487**	0.340

Eigenvalues for Factor 1 and Factor 2 are 2.401 and 1.174, respectively.
Reliability (Alpha Cronbach) scale 1 r = 0.76, scale 2 r = 0.16 Total variance explained: 51.07%

Table VI-8 below reports the correlations between intention factors (reduce driving and maintain car use) and acceptability evaluation for each package in each city. In general, there is no sign of consistent correlation pattern between the intention factors and acceptability evaluation, both, in terms of significance level and direction (sign) for the different cases. In the cases of Bangkok sample, for instance, all correlations between the two aspects are found highly significant. Both factors are positively correlated with acceptability, except for intentions to reduce/switch car use to other modes in the case of Package *C*. These could mean that while a strategy is acceptable to a person, se/he may have intentions to behave accordingly (as expected by the policy maker) as well as to adjust their behaviors in such a way to keep his/her customs. In contrast with Bangkok sample, taking a look at the Kuala Lumpur sample, one is to conclude that there is no single evidence of significant correlation at the .05 level between the intention factors and acceptability of any package. Therefore, it should be avoided to assume a direct and consistent relation between acceptability of TDM policies and intentions to reduce or maintain the current level of car use. Mediating relations between the two aspects via third-class variables are perhaps more likely.

Table VI-8 Correlation between acceptability and the two intention factors

	Correlation (r)	Behavioral intentions in the case of each proposed package					
		Package *A*		Package *B*		Package *C*	
		Reduce driving and/or switch to other modes	Maintain/ modify car use	Reduce driving and/or switch to other modes	Maintain/ modify car use	Reduce driving and/or switch to other modes	Maintain/ modify car use
Acceptability of the proposed package		**Bangkok**					
	Package *A*	.2431***	.2997***				
	Package *B*			.3110***	.3313***		
	Package *C*					-.2440***	.4831***
		Jakarta					
	Package *A*	.1000	-.0166				
	Package *B*			.2188**	.0091		
	Package *C*					.0505	-.1386
		Kuala Lumpur					
	Package *A*	.1394*	.1077				
	Package *B*			.1247	.1307		
	Package *C*					.0648	.1125
		Manila					
	Package *A*	.1635**	-.0176				
	Package *B*			.1110	.1478**		
	Package *C*					-.1540**	.0258

***Significant at the .01 level **Significant at the .05 level *Significant at the .10 level

6.3 ORDERED PROBIT REGRESSION MODELS

A series of multiple regression models will be estimated to investigate the main research questions, particularly to explain which factors influence the current (i.e. rather low) level of acceptability of the TDM measures. Since acceptability as the dependent variable was measured in an ordinal scale, ordered probit regression model is thus chosen. In general, the objective of a regression method is to form a multiple regression equation by weighting and summing the values of independent variables in such a way that the best possible prediction of any individual's score on the dependent variable is received.

Prior to estimating models, assumptions regarding the causal relationships between acceptability and its determinants are summed up. Table VI-9 recaps the assumptions derived from the preceding theoretical review and analysis.

Table VI-9 Assumed relationship between some explanatory factors and acceptability of TDM

Aspects	**Variable name**	**Assumption**	**Expected sign**
Problem perception	FPPS_MOB FPPS_ENV FPPP_MOB FPPP_ENV	The more a person perceives transportation problems (either mobility or environmental) as pressing to himself and/or his society, the more he will be willing to accept a strategy to overcome such problems. However, this aspect is only considered a background aspect. The more direct aspects to consider the acceptability of the proposed program (e.g. perceived effectiveness) could nullify such an assumption.	(+)
Self-attribution of responsibility	FATR_SLF	A person who has a sense (score) of internal attribution of responsibility would consider his personal contribution an important part to solving transportation problem. He could do this by accepting the proposed program and behaving accordingly. Thus, this kind of person is more willing to accept the strategy. Again, this is only a background aspect.	(+)
Car use as important aim to reach	FAIMCAR	The more a person values car use as his important mobility aim, the more he will perceive TDM as infringement to his freedom of using his car. Hence, he will unlikely accept the proposed restriction programs	(–)
Knowledge of option	INFO_? Note: ? can be A, B, or C	When a person is more familiar (has some knowledge) with a strategy, he will likely perceive it more acceptable. This particular assumption is made after the experience of the Manila sample with their UVVRP	(+)
Perceived effectiveness	EFF_?	A more effective strategy should be more attractive, and hence more acceptable, because it could better relieve the perceived problems.	(+)
Personal outcome expectation	ADV_?	The more a person could expect that a program would benefit him, the more he will be willing to accept the program.	(+)
Social norm (perceived pressure from one's important others to accept the proposed policy)	SNORM_?	The more a person perceives a pressure from his important others (family, friends, etc) to accept the proposed strategy, the more the would accept the strategy	(+)
Socio-economic features: gender, age, educational background, household size, household income, car ownership, car as primary moving modus, trip destination	SEX AGE INC EDUC01 NHH INC CAROWN MOD_CAR DEST	No specific assumption. However, following economic rationale, people who come from a household with lower income level would unlikely accept TDM programs because of their higher marginal utility of money and decreased willingness to pay to reduce externalities.	(+) for income level

The above assumptions are first checked through a simple correlation analysis where each of the aspects is directly correlated with the acceptability. Table VI-10 shows the results. As shown, correlations with 'direct' psychological aspects (knowledge of option, perceived effectiveness, personal outcome expectation and social norm) are found strong and in accord with the assumptions in almost all cases. Correlations with the remaining aspects are less consistent.

Table VI-10 Correlations between acceptability and some possible explanatory factors

Correlation	Acceptability of Package *A*				Acceptability of Package *B*				Acceptability of Package C			
	Bangkok	Jakarta	K. Lumpur	Manila	Bangkok	Jakarta	K. Lumpur	Manila	Bangkok	Jakarta	K. Lumpur	Manila
Knowledge of option (infmtn.)	.2516 *** p=.000	.1917 ** p=.034	.3679 *** p=.000	.2228 *** p=.001	.1305 * p=.066	.2438 *** p=.007	.5031 *** p=.000	.3828 *** p=.000	.3184 *** p=.000	.1824 ** p=.044	.4561 *** p=.000	.3273 *** p=.000
Perceived effectiveness	.2619 *** p=.000	.6861 *** p=.000	.6295 *** p=.000	.4578 *** p=.000	.3706 *** p=.000	.6478 *** p=.000	.7750 *** p=0.00	.5034 *** p=.000	-.0575 p=.420	.7487 *** p=0.00	.6952 *** p=0.00	.5671 *** p=0.00
Personal outcome expct.	.5686 *** p=.000	.6449 *** p=.000	.6937 *** p=0.00	.5545 *** p=0.00	.4654 *** p=.000	.5792 *** p=.000	.5680 *** p=.000	.5771 *** p=0.00	.5263 *** p=.000	.5653 *** p=.000	.6334 *** p=.000	.6326 *** p=0.00
Perceived social norm to accept	.6149 *** p=0.00	.5661 *** p=.000	.6998 *** p=.000	.5780 *** p=0.00	.4811 *** p=.000	.5166 *** p=.000	.6482 *** p=.000	.6444 *** p=.000	.7329 *** p=0.00	.6945 *** p=.000	.6963 *** p=.000	.6795 *** p=0.00
Gender (0/1= fe/male)	-.0497 p=.486	-.0038 p=.967	-.1994 ** p=.014	-.0986 p=.147	.2054 *** p=.004	.0099 p=.914	-.1374 * p=.093	-.0594 p=.383	-.1095 p=.124	-.2331 ** p=.010	-.1222 p=.135	.1084 p=.111
Education (0/1= below/undrgrd.)	-.2421 *** p=.000	-.2350 *** p=.009	.2035 ** p=.012	-.1319 * p=.052	-.1742 ** p=.014	.0261 p=.775	.0172 p=.834	-.1745 ** p=.010	-.1187 * p=.095	.0846 p=.354	.1639 ** p=.044	-.0245 p=.720
Age	.1483 ** p=.037	.2171 ** p=.018	-.0314 p=.706	-.0188 p=.785	.1793 ** p=.011	.1283 p=.164	-.0048 p=.954	.0136 p=.843	.1195 * p=.093	.0834 p=.367	-.1162 p=.161	-.0323 p=.638
Household size	-.0189 p=.792	-.1685 p=.101	-.0281 p=.741	.0741 p=.297	-.1591 ** p=.026	-.2589 ** p=.011	.0345 p=.685	.0604 p=.395	-.2230 *** p=.002	-.0588 p=.569	-.0130 p=.879	-.0381 p=.592
Car ownership	-.2215 *** p=.002	.0309 p=.736	-.0799 p=.330	-.1029 p=.132	-.1138 p=.109	.0344 p=.706	-.0341 p=.678	-.0937 p=.170	-.1603 p=.024	-.0740 p=.418	-.2145 *** p=.008	-.0552 p=.419
Mndtry trip destination	.0156 p=.827	-.0442 p=.628	.0643 p=.434	-.0416 p=.547	.0510 p=.474	-.1738 * p=.056	-.0029 p=.971	.0835 p=.226	-.1094 p=.123	-.0736 p=.421	.1487 * p=.069	.0314 p=.649
Household's income level	-.0293 p=.681	.0452 p=.624	.1201 p=.142	-.0071 p=.917	-.2161 *** p=.002	-.0877 p=.341	.1082 p=.186	.0175 p=.798	-.0298 p=.676	.0541 p=.557	.1369 * p=.094	-.0288 p=.673
Car as primary moving modus	.1056 p=.138	-.0341 p=.710	-.0741 p=.367	-.1545 ** p=.023	.0428 p=.549	-.1232 p=.177	-.0668 p=.417	-.0081 p=.905	.2354 *** p=.000	-.0912 p=.318	-.1395 * p=.089	.0401 p=.558
Societal prblm percpt: envirmt.	.0557 p=.434	-.1087 p=.233	.0626 p=.445	.2087 *** p=.002	-.0360 p=.614	.0299 p=.744	-.0073 p=.929	.0860 p=.207	.0011 p=.987	-.0055 p=.952	.1219 p=.136	-.0714 p=.295
Societal prblm percpt: mobility	.0127 p=.859	-.1584 * p=.081	-.0551 p=.501	.0685 p=.315	.0881 p=.216	-.0481 p=.599	.0187 p=.820	.1444 ** p=.033	.1484 ** p=.036	-.0157 p=.864	.1413 * p=.083	-.0042 p=.951
Personal prblm percpt: envirmt	.0285 p=.690	-.0666 p=.466	.1047 p=.201	.2396 *** p=0.00	.0465 p=.514	-.0253 p=.782	-.0712 p=.385	-.0144 p=.833	-.0533 p=.455	-.0060 p=.947	.0879 p=.283	.0387 p=.571
Personal prblm percpt: mobility	.1369 * p=.054	-.0457 p=.617	-.0448 p=.585	-.1186 * p=.081	.1045 p=.142	-.0354 p=.699	.0277 p=.736	.0389 p=.569	.1634 ** p=.021	-.0459 p=.616	.0960 p=.241	-.0151 p=.825
Internal attrib. of responsibility	-.0130 p=.855	.0565 p=.537	.1197 p=.143	.0503 p=.460	.0188 p=.792	.0564 p=.538	.0509 p=.535	.1347 ** p=.047	.0844 p=.236	-.0374 p=.683	.0487 p=.552	.0388 p=.569
Importnt aims to reach: car use	.0848 p=.235	-.1868 ** p=.039	-.1375 * p=.092	-.1222 * p=.072	-.0277 p=.698	-.0961 p=.293	-.0942 p=.250	.0181 p=.790	.0816 p=.253	-.0802 p=.380	-.1014 p=.215	.0072 p=.916

***p<.010 **p<.050 *p<.100

Ordered probit regression models were estimated for both, the whole sample and the separate city samples, because of the assumption that possible relations between the variables could vary between the examined cities. For all cases, the variable to be predicted is ‘acceptability’, that is the degree of approval or disapproval of the respective policy package (*A*, *B*, or *C*). The dependent variables comprise two groups, i.e. psychometrical and socio-economic variables. The former consists of knowledge about the package, perceived effectiveness, general personal outcome expectation, perceived social pressure to accept the policy, personal problem perception, attribution of responsibility, and car use as important aim to reach. Meanwhile, gender type, household size and income, age, education background, and car as primary moving modus constitute the later. All models were estimated by computer program STATA SE 8.0.

Table VI-11 Ordered probit regression analysis of the acceptability of Package *A*

Variable	Dependent variable: Acceptability of Package *A*											
	Bangkok			Jakarta			Kuala Lumpur			Manila		
	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value
Knowledge of option	0.1621 *	0.082	0.048	0.4800 ***	0.122	0.000	0.2988 **	0.096	0.002	0.1137	0.066	0.087
Perceived effectiveness	0.3389 ***	0.087	0.000	0.7032 ***	0.176	0.000	0.4397 ***	0.119	0.000	0.2388 *	0.094	0.011
Personal outcome expectation	0.3694 **	0.139	0.008	0.7918 ***	0.171	0.000	0.6087 ***	0.137	0.000	0.3099 ***	0.092	0.001
Perceived social norm	0.6237 ***	0.149	0.000	0.3086 *	0.156	0.047	0.3381 *	0.134	0.012	0.3278 ***	0.098	0.001
Personal mobility problem perception	-0.0392	0.152	0.796	-0.1822	0.155	0.241	-0.1090	0.094	0.247	0.0650	0.086	0.449
Personal environmental problem perception	0.1784	0.137	0.194	-0.1781	0.172	0.302	-0.1055	0.101	0.297	0.2102 *	0.091	0.021
Car use as important aim to reach	0.1808	0.106	0.088	-0.0731	0.150	0.627	-0.0577	0.116	0.620	-0.1093	0.098	0.266
Internal attribution of responsibility	-0.1450	0.075	0.054	-0.2706	0.195	0.165	-0.0578	0.138	0.675	0.0613	0.108	0.570
Sex type (0: female; 1: male)	-0.2095	0.185	0.259	-0.6032 *	0.302	0.046	-0.4749 *	0.226	0.035	-0.1787	0.185	0.333
Education level (1: undergrd or higher; 0: otherwise)	0.4056	0.308	0.187	-0.2634	0.385	0.494	0.1139	0.242	0.638	-0.6231	0.344	0.070
Age	0.0162	0.011	0.150	0.0168	0.018	0.341	0.0106	0.017	0.533	0.0018	0.007	0.794
Household income level	0.0790	0.069	0.250	0.0483	0.080	0.547	0.0730	0.093	0.432	0.0145	0.064	0.821
Household size	0.0388	0.048	0.416	0.0651	0.078	0.403	-0.0589	0.055	0.287	0.0194	0.032	0.538
Car as primary moving modus	-0.3875	0.227	0.088	0.3159	0.323	0.329	0.1136	0.282	0.687	0.0884	0.182	0.628
Model summary:												
No of observation:	196			92			136			184		
LR chi-sqr:	137.34			105.95			155.54			108.34		
Prob > chi-sqr:	0.000			0.000			0.000			0.000		
Pseudo R2:	0.2758			0.391			0.3873			0.2154		
Log likelihood:	-180.3			-82.512			-123.04			-197.4		

legend: * p<0.05; ** p<0 .01; *** p<0.001

Estimation results for the acceptability of Package *A* for each sample are shown in Table VI-11. As can bee seen, generally, higher valuation of perceived effectiveness, benefit expectation, higher perceived social pressure, and higher level of subjective information are expected to increase the acceptability of Package *A*. Meanwhile, only one of the problem perception variables, i.e. environmental problem perception, is found significant and has positive effect to acceptability. This case is indicated in Manila's model. In Jakarta and Kuala Lumpur models, there is tendency that women would disapprove the policy. However, it is unlikely that the relationship between gender and acceptability is causative. In general, the models qualify to account for 20 to 40 percents of the criterion variance.

Table VI-12 Ordered probit regression analysis of the acceptability of Package *B*

Variable	Dependent variable: Acceptability of Package *B*											
	Bangkok			Jakarta			Kuala Lumpur			Manila		
	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value
Knowledge of option	-0.0201	0.078	0.796	0.1562	0.109	0.151	-0.0323	0.097	0.738	0.2094 ***	0.062	0.001
Perceived effectiveness	0.7131 ***	0.105	0.000	0.7276 ***	0.147	0.000	0.8657 ***	0.128	0.000	0.3862 ***	0.111	0.001
Personal outcome exp.	0.0014	0.156	0.993	0.7195 ***	0.162	0.000	0.4173 ***	0.125	0.001	0.2786 *	0.128	0.030
Perceived social norm	0.7214 ***	0.171	0.000	0.0750	0.175	0.668	0.3066 *	0.136	0.025	0.5475 ***	0.128	0.000
Personal mobility problem perception	0.1503	0.141	0.286	-0.0784	0.147	0.593	-0.0454	0.097	0.639	0.0128	0.088	0.885
Personal environmental problem perception	0.0925	0.126	0.463	-0.3507 *	0.176	0.046	-0.1236	0.095	0.195	0.0589	0.094	0.529
Car use as important aim to reach	0.2658 *	0.109	0.015	0.0168	0.145	0.908	-0.1407	0.114	0.217	0.0375	0.1	0.709
Internal attribution of responsibility	-0.0333	0.069	0.629	0.1064	0.202	0.599	-0.0232	0.141	0.869	0.1691	0.111	0.127
Sex type (0: female; 1: male)	0.4558 *	0.178	0.010	-0.6588 *	0.310	0.033	-0.3512	0.232	0.130	0.0381	0.19	0.842
Education level (1: undergdr or higher; 0: otherwise)	0.2553	0.291	0.381	-0.5617	0.380	0.139	-0.2641	0.246	0.283	-1.1954 **	0.373	0.001
Age	0.0163	0.011	0.129	0.0162	0.017	0.338	-0.0142	0.017	0.412	0.0124	0.007	0.093
Household income level	0.0772	0.072	0.285	-0.1283	0.081	0.114	0.0759	0.096	0.429	-0.1281	0.068	0.060
Household size	0.0009	0.047	0.984	-0.1076	0.086	0.212	0.0654	0.058	0.260	0.0498	0.032	0.123
Car as primary moving modus	-0.6840 **	0.238	0.004	-0.1816	0.293	0.535	-0.0452	0.288	0.875	0.2692	0.193	0.162
Model summary:												
No of observation:	196			92			136			184		
LR chi-sqr:	116.01			96.71			150.3			146.72		
Prob > chi-sqr:	0.000			0.000			0.000			0.000		
Pseudo R2:	0.2176			0.3595			0.3834			0.2927		
Log likelihood:	-208.6			-86.151			-120.9			-177.3		

legend: * p<0.05; ** p<0 .01; *** p<0.001

The regression analysis for Package *B* is shown in Table VI-12 above. Each model in the above table apparently shows a unique feature. There are variations of significance between cities regarding the psychological and socioeconomic variables. Knowledge of option does not seem to have effect in Bangkok, Jakarta, and Kuala Lumpur models. Furthermore, outcome expectation does not play role in Bangkok model, while in Jakarta perceived social pressure has no effect to acceptability of Package *B*. In Manila model, the importance of information, outcome expectation, perceived effectiveness, and social norm for reducing car use are found significant in increasing acceptability. In this particular model, household income is found significant at p <.10 level. The sign is surprisingly in contrast with the assumption made (Table VI-9). This means that higher support is more expected in lower income levels.

Table VI-13 Ordered probit regression analysis of the acceptability of Package *C*

Variable	Dependent variable: Acceptability of Package *C*											
	Bangkok			Jakarta			Kuala Lumpur			Manila		
	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value
Knowledge of option	0.1927 *	0.088	0.029	0.2532	0.140	0.070	0.1500	0.094	0.109	0.0537	0.091	0.553
Perceived effectiveness	-0.0273	0.074	0.714	0.6111 ***	0.175	0.000	0.7651 ***	0.123	0.000	0.4403 ***	0.085	0.000
Personal outcome exp.	-0.0198	0.135	0.883	0.0829	0.191	0.664	0.2469 *	0.123	0.046	0.3694 **	0.123	0.003
Perceived social norm	1.2170 ***	0.152	0.000	1.0047 ***	0.213	0.000	0.5952 ***	0.132	0.000	0.4563 **	0.121	0.000
Personal mobility problem perception	0.3836 **	0.143	0.007	0.0784	0.146	0.591	0.1379	0.096	0.152	0.0484	0.09	0.589
Personal environmental problem perception	0.2787 *	0.137	0.042	-0.2002	0.179	0.262	0.2020 *	0.098	0.039	0.1217	0.093	0.192
Car use as important aim to reach	-0.1456	0.107	0.172	-0.0555	0.143	0.697	-0.3156 **	0.118	0.007	-0.0649	0.102	0.523
Internal attribution of responsibility	0.1990 **	0.068	0.003	0.0258	0.193	0.894	-0.2987 *	0.140	0.033	0.1811	0.115	0.117
Sex type (0: female; 1: male)	-0.4541 *	0.191	0.017	-0.6999 *	0.318	0.028	-0.0245	0.229	0.915	0.2731	0.193	0.157
Education level (1: undergdr or higher; 0: otherwise)	-0.2894	0.294	0.325	0.0388	0.391	0.921	0.3870	0.243	0.111	0.0304	0.349	0.931
Age	-0.0394 ***	0.011	0.001	0.0313	0.018	0.076	-0.0258	0.018	0.144	0.0070	0.007	0.333
Household income level	0.0381	0.069	0.580	0.0403	0.083	0.629	0.1385	0.095	0.146	-0.0210	0.066	0.750
Household size	-0.0515	0.049	0.293	0.0443	0.078	0.569	-0.0508	0.056	0.363	-0.0298	0.032	0.353
Car as primary moving modus	0.3880	0.224	0.083	0.1349	0.331	0.683	-0.2091	0.292	0.473	0.0931	0.184	0.613
Model summary:												
No of observation:	196			92			136			184		
LR chi-sqr:	189.19			111.85			165			160.33		
Prob > chi-sqr:	0.000			0.000			0.000			0.000		
Pseudo R2:	0.3237			0.4212			0.409			0.2877		
Log likelihood:	-197.6			-76.863			-119.2			-198.5		

legend: * p<0.05; ** p<0 .01; *** p<0.001

Table VI-13 above presents the results of model estimation in the case of acceptability of Package *C*. Again, variations between cities are apparent. Knowledge of option is found significant and positively influence acceptability only in the case of Bangkok. Both, in Kuala Lumpur and Bangkok models, problem perceptions (environmental in Kuala Lumpur and both, environmental and mobility problems in Bangkok) are found as an important issue that play role in acceptability evaluation of Package *C*. As expected, internal attribution of responsibility and car use as important mobility aim significantly follow the assumed role (Table VI-9) in Bangkok and Kuala Lumpur models, respectively. However, internal attribution in Kuala Lumpur model tends to go against the assumption. In all cases, social norm holds an influential role in the evaluation of acceptability. The models could account for 30 to 40 percents of variance found in the dependent variable.

Table VI-14 Pooled ordered probit models for the acceptability of Package *A*, *B*, and *C*

Variable	Pooled models								
	Dep. Var.: Acc_ *A*			Dep. Var.: Acc_*B*			Dep. Var.: Acc_*C*		
	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value	Coeff.	Stdr. Error	p-value
Knowledge of option	0.2074 ***	0.038	0.000	0.1362 ***	0.036	0.000	0.1433 **	0.044	0.001
Perceived effectiveness	0.3319 ***	0.047	0.000	0.5647 ***	0.050	0.000	0.2559 ***	0.042	0.000
Personal outcome exp.	0.4042 ***	0.054	0.000	0.3561 ***	0.062	0.000	0.1924 **	0.060	0.001
Perceived social norm	0.3525 ***	0.057	0.000	0.3605 ***	0.063	0.000	0.7471 ***	0.062	0.000
Personal mobility problem perception	-0.0265	0.048	0.579	-0.0201	0.048	0.677	0.0924	0.048	0.055
Personal environmental problem perception	0.0824	0.047	0.082	-0.0114	0.047	0.810	0.0825	0.048	0.086
Car use as important aim to reach	-0.0488	0.048	0.306	0.0003	0.048	0.995	-0.0426	0.048	0.371
Internal attribution of responsibility	-0.0307	0.047	0.510	0.0470	0.046	0.309	0.1111 *	0.046	0.015
Sex type (0: female; 1: male)	-0.2884 **	0.097	0.003	0.0001	0.097	0.999	-0.1728	0.097	0.074
Education level (1: undergrd or higher; 0: otherwise)	-0.0471	0.125	0.705	-0.2026	0.126	0.108	0.0460	0.127	0.717
Age	0.0093	0.005	0.052	0.0064	0.005	0.181	-0.0016	0.005	0.747
Household size	-0.0044	0.019	0.816	0.0443 *	0.020	0.024	-0.0191	0.019	0.320
Car as primary moving modus	0.0200	0.103	0.846	-0.0605	0.104	0.56	0.2135 *	0.103	0.039
Model summary:									
No of observation:	611			611			611		
LR chi-sqr:	442.89			541.04			504.58		
Prob > chi-sqr:	0.000			0.000			0.000		
Pseudo R^{2}:	0.2576			0.2961			0.2736		
Log likelihood:	-638.2			-643.23			-670		

legend: * p<0.05; ** p<0 .01; *** p<0.001

Finally, three pooled models were estimated from the whole sample (Table VI-14). The results generally show confirmations of some relationships assumed earlier (Table VI-9). In addition, the following tables (Table VI-15 to VI-17) show the cross-tabulation between measured and predicted responses on acceptability based on the models presented in Table VI-14. The tables generally show a fairly good approximation of measured values by the outcomes predicted from the models.

Table VI-15 Measured vs. predicted responses in the case of Acceptability of Package *A*

Acceptability of Package *A*		PREDICTED					
		-2	-1	0	1	2	Total
MEASURED	-2	21	32	11	0	0	64
	1	5	63	73	8	0	149
	0	2	35	224	41	1	303
	1	0	1	62	59	5	127
	2	0	1	11	25	11	48
Total		28	132	381	133	17	691

Table VI-16 Measured vs. Predicted responses in the case of Acceptability of Package *B*

Acceptability of Package *B*		PREDICTED					
		-2	-1	0	1	2	
MEASURED	-2	65	26	13	0	0	104
	-1	15	49	65	9	0	138
	0	2	41	179	27	2	251
	1	0	5	59	69	5	138
	2	0	1	11	27	21	60
Total		82	122	327	132	28	691

Table VI-17 Measured vs. Predicted responses in the case of Acceptability of Package *C*

Acceptability of Package *C*		PREDICTED					
		-2	-1	0	1	2	Total
MEASURED	-2	74	48	12	1	0	135
	-1	12	115	53	7	0	187
	0	7	31	144	29	2	213
	1	0	6	45	44	12	107
	2	0	1	11	22	15	49
Total		93	201	265	103	29	691

The interactions between the independent variables have not been taken into account for the above-reported analyses. Multicollinearity is indeed possible to occur between the predictor variables. This holds, for instance, in the case of social norm and outcome expectation variables. Tables reporting the correlations among explanatory variables are provided in the Appendix. However, this threat does not seem to cause severe problems for the models are still able to produce well-defined estimates with relatively low standard errors.

The variables examined in direct connection with the policy packages (i.e. information, perceived effectiveness, personal outcome expectation, and social norm) are highly significant and positively influence acceptability evaluation of the packages. These aspects hence need to be considered seriously in TDM policy formulation in order to be socially feasible.

Social norm, that is the pressure towards conformity exercised by relevant other theoretically influence personal opinions, feelings and behavioral intentions, above all in a situation with a rather uncertain physical basis for judgment (Schade and Schalg, 2000). This assertion is confirmed in this study as this factor appears to be one of the strongest factors which influence acceptability evaluation. Therefore, if the social norm could be changed in a favorable way toward TDM policies, a respective alignment of personal attitudes could be expected.

Among the influential predictors is the personal expectation outcome. The one who expects certain benefits shows a significant higher acceptability for the specific strategies. Conversely, the one who anticipate disadvantages would disapprove the strategies. In connection with the perceived effectiveness (another strong factor influencing acceptability), Rienstra et al (1999) stated that '*strategic responses on perceived effectiveness may occur when respondents try to justify their rejection of painful policies by claiming that they perceive them as ineffective'*. The personal expectation outcome can be included to tentatively test such a statement. The assumption is that persons who expect mainly disadvantages evaluate the policies as being ineffective to justify their disapproval of the proposed policies (after: Schade and Schlag, 2000). Table VI-15 shows the correlations between 'perceived effectiveness', 'acceptability' and 'personal outcome expectation'.

Table VI-18 Correlation of perceived effectiveness, outcome expectation and acceptability

	ACC_A	ADV_A	ACC_B	ADV_B	ACC_C	ADV_C
Bangkok						
Perceived effectiveness (EFF_A)	0.262**	0.039				
Personal outcome expectation (ADV_A)	0.568**					
Perceived effectiveness (EFF_B)			0.371**	0.005		
Personal outcome expectation (ADV_B)			0.465**			
Perceived effectiveness (EFF_C)					-0.057	0.062
Personal outcome expectation (ADV_C)					0.526**	
Jakarta						
Perceived effectiveness (EFF_A)	0.686**	0.492**				
Personal outcome expectation (ADV_A)	0.645**					
Perceived effectiveness (EFF_B)			0.648**	0.410**		
Personal outcome expectation (ADV_B)			0.580**			
Perceived effectiveness (EFF_C)					0.749**	0.578**
Personal outcome expectation (ADV_C)					0.565**	
Kuala Lumpur						
Perceived effectiveness (EFF_A)	0.630**	0.487**				
Personal outcome expectation (ADV_A)	0.693**					
Perceived effectiveness (EFF_B)			0.775**	0.457**		
Personal outcome expectation (ADV_B)			0.567**			
Perceived effectiveness (EFF_C)					0.695**	0.526**
Personal outcome expectation (ADV_C)					0.633**	
Manila						
Perceived effectiveness (EFF_A)	0.458**	0.400**				
Personal outcome expectation (ADV_A)	0.554**					
Perceived effectiveness (EFF_B)			0.503**	0.449**		
Personal outcome expectation (ADV_B)			0.577**			
Perceived effectiveness (EFF_C)					0.567**	0.393**
Personal outcome expectation (ADV_C)					0.632**	

** significant at $p < 0.05$

In Bangkok's case, the idea of strategic responses may be ignored since there is no evidence of significant correlation between perceived effectiveness and outcome expectation. As for the other cities, there is a significant correlation between the expectation of disadvantages and low effectiveness. This type of correlation is relatively lower than the correlations between equity and acceptability and between perceived effectiveness and acceptability. However, the hypothesis is further checked by performing partial correlations while controlling for the effect of acceptability. Table VI-16 reports the results of this analysis.

Table VI-19 Partial correlations controlling for the effect of acceptability variables

Controlling for Acceptability of Package A, B, and C, respectively				
		Personal outcome expectations		
		A	B	C
Jakarta	Perceived effectiveness A	0.0884		
	Perceived effectiveness B		0.0534	
	Perceived effectiveness C			0.2838***
Kuala Lumpur	Perceived effectiveness A	0.0907		
	Perceived effectiveness B		0.0319	
	Perceived effectiveness C			0.1533*
Manila	Perceived effectiveness A	0.197***		
	Perceived effectiveness B		0.2248***	
	Perceived effectiveness C			0.0539

note: *** p< 0.01; ** p<0.05; * p<0.100

From the above table, it can be shown that strategic responses likely occurred in Jakarta, in the case of Package *C*. Kuala Lumpur sample also likely produced strategic responses in the case of Package *C*, but in a considerably lesser significance level. Manila sample produces strong correlations between the two variables as well. However, checking back to the distribution of the two aspects (Chapter V), these relations evidently tend to go into 'expect mainly advantages – perceived as effective' way, instead of 'expect mainly disadvantages – perceived as rather ineffective'.

Of background variables (Table VI-14), problem awareness and internal attribution of responsibility, in some cases, also qualify as predictors for acceptability, although not as strong as the directly connected variables mentioned previously. As noted in table VI-14, income level was excluded from the estimation. Hence, the assumption regarding income level could not be verified in the pooled probit regression models.

As stated previously, the interactions between explanatory factors are plausible, and yet, these are difficult to be modeled with a single equation model (like ordered probit regression). Therefore, although the preceding analysis has discovered some important findings, it is naturally challenging to further identify the more complex underlying structure of acceptability. An approach that may be useful in this context is Structural Equation Model (SEM).

6.4 STRUCTURAL EQUATION MODELING (SEM) APPROACH

Structural Equation Modeling (SEM) works by confirming an assumed theoretical construct, and therefore, it is first necessary to propose how the different determinants of people's acceptability of TDM measures may be causally related.

In accordance with the literature review (Chapter II) and the results of the previous analyses, it is generally assumed that acceptability of a TDM measure is directly influenced by subjective level of knowledge about the measure, perceived effectiveness, outcome expectation, and perceived social pressure to accept the proposed policies (the so-called social norm). Social norm is also assumed to influence perceived effectiveness and outcome expectation, and hence it adds indirect causal relations to acceptability via these two aspects. Perceived effectiveness, in addition to directly influencing acceptability, also influences it indirectly through its direct impact to outcome expectation. Evaluation of effectiveness and outcome expectation may also be influenced by voluntary intentions to reduce driving in that if one has intentions to drive less and switch to an alternative mode, he would feel that the policy is effective, and he may expect to be advantaged. One's intention to reduce driving may be influenced by the social norm and his income level. On the other hand, if one sees car use as his/her important mobility aim, he would tend to expect disadvantages by TDM measures. One may eventually possess car use as important mobility aim because, among other, car has become his/her primary moving modus and his/her income level supports him/her to do so.

These theoretical constructs were estimated using SEM (computer program SePath by Steiger, as implemented in STATISTICA 6.0, StatSoft Inc., 2001). Table VI-17 and Figure VI-1 below report the estimation results and graphical representation of the estimated constructs. Pooled dataset of the acceptability of TDM Package *A* was used to empirically test the above assumptions.

Table VI-20 Maximum likelihood estimation results for SEM of Acceptability of TDM Package *A*

Regression results	**Parameter**	**Std. Error**	**T**	**Prob.**
[MOD_CAR]-1->[FAIMCAR]	0.442	0.079	5.577	0.000
[INC]-2->[FINT_A_R]	-0.051	0.020	-2.628	0.009
[INC]-3->[FAIMCAR]	0.062	0.019	3.204	0.001
[SNORM_A]-4->[FINT_A_R]	0.140	0.032	4.379	0.000
[SNORM_A]-5->[ADV_A]	0.673	0.030	22.070	0.000
[SNORM_A]-6->[EFF_A]	0.327	0.033	9.875	0.000
[SNORM_A]-7->[ACC_A]	0.237	0.033	7.120	0.000
[FINT_A_R]-8->[FAIMCAR]	-0.123	0.037	-3.304	0.001
[FINT_A_R]-9->[EFF_A]	0.201	0.039	5.142	0.000
[FINT_A_R]-10->[ADV_A]	0.090	0.035	2.615	0.009
[FAIMCAR]-11->[ADV_A]	-0.117	0.033	-3.496	0.000
[EFF_A]-12->[ADV_A]	0.067	0.033	2.030	0.042
[EFF_A]-13->[ACC_A]	0.223	0.027	8.179	0.000
[ADV_A]-14->[ACC_A]	0.262	0.032	8.268	0.000
[INFO_A]-15->[ACC_A]	0.108	0.021	5.043	0.000

Basic summary statistics	**Value**
Discrepancy Function	0.139
Maximum Residual Cosine	0.000
Maximum Absolute Gradient	0.000
ICSF Criterion	0.000
ICS Criterion	0.000
ML Chi-Square	93.785
Degrees of Freedom	21.000
p-level	0.000
RMS Standardized Residual	0.060

Non-centrality Fit Indices	**Lower 90%**	**Point**	**Upper 90%**
Population Noncentrality Parameter	0.063	0.101	0.150
Steiger-Lind RMSEA Index	0.055	0.069	0.085
McDonald Noncentrality Index	0.928	0.951	0.969
Population Gamma Index	0.968	0.978	0.986
Adjusted Population Gamma Index	0.931	0.953	0.970

Single Sample Fit Indices	**Value**
Joreskog GFI	0.971
Joreskog AGFI	0.939
Akaike Information Criterion	0.210
Schwarz's Bayesian Criterion	0.370
Browne-Cudeck Cross Validation Index	0.211
Independence Model Chi-Square	1246.533
Independence Model df	36.000
Bentler-Bonett Normed Fit Index	0.925
Bentler-Bonett Non-Normed Fit Index	0.897
Bentler Comparative Fit Index	0.940
James-Mulaik-Brett Parsimonious F.I.	0.539
Bollen's Rho	0.871
Bollen's Delta	0.941

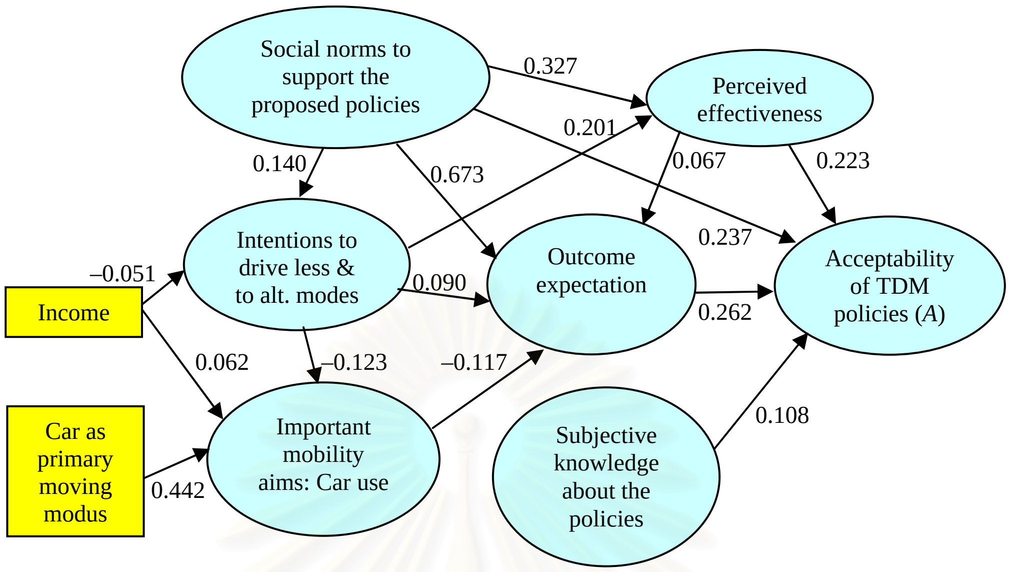


Figure VI-1 SEM Model for Acceptability of TDM Package *A*

Before going into the detail of estimation results, the goodness-of-fit (GOF) of the model are first assessed. The model produces a significant Chi-square statistic of 93.785 with 21 degrees of freedom. The statistic Chi-square/df is therefore 4.46. Considering that this statistic should be less than 5 for a good model (Washington et al, 2003), the value is hence acceptable. The RMS Residual of the model is 0.060, which slightly misses the recommended value of lower than 0.050. However, the RMSEA index is still within the acceptable range of 0.08 or less. Values of Joreskog GFI and Population Gamma Index (PGI) are both higher than 0.95, indicating a good fit. Also, Joreskog AGFI and Adjusted PGI are both close to 0.95. Regarding the incremental fit measures, Bentler-Bonett NFI is higher than 0.90, as expected. Also, Bentler CFI is higher than 0.90. Finally, the low values of information theoretic measures (Akaike IC and Browne-Cudeck CVI) are as expected. The GOF statistics for the SEM above are thus generally encouraging.

Having a warranty from the respectable goodness-of-fit results, the parameter estimation results are now examined. As show in Table VI-17, 15 simultaneous equations were estimated, and all the estimated parameters are highly significant and in agreement with the proposed assumptions. Figure VI-1 perhaps more clearly represents the results. The model results confirm the important role of subjective knowledge, perceived effectiveness, outcome expectation and social norm as direct predictors of people’s readiness to accept the proposed TDM policies. The model also identifies the critical role of social norm in positively influencing perceived effectiveness, outcome expectation, and voluntary intentions to drive less and use alternative modes. Moreover, it recognizes the role of car dependency (as represented by car use as important mobility aims) that causes one to expect disadvantages from the TDM policies. Lastly, it recognizes that car dependency may be formed as one always uses car as his primary mode to commute and his income level supports him to do so. The role of income (i.e. its magnitudes), however, is lower than initially expected.

Despite its significance, the developed model has not introduced the role of problem awareness and internal attribution of responsibility in the structure. This is unlikely because of model misspecification, but rather because reasonable causal relations were not found in the collected sample. Nevertheless, the importance of problem awareness in this particular sample has been shown in Chapter V (Table V-53) in that it has significant correlation with the idea of limiting traffic volume, not necessarily with the more-specified TDM programs.

Attempts were also made to estimate structural models for the other two TDM packages using similar assumptions. However, the results were poor in that the models contained some insignificant parameters and had lower quality in terms of their GOF indices. Estimation results for the two models are provided in Appendix. Aside from the insignificant parameters, the remaining assumptions still hold.

Chapter VII
Conclusions and Recommendations

7.1. SUMMARY OF FINDINGS

This research departs from the motivation of finding an explanation for the fact that various attempts to control transportation demand through many TDM measures in Bangkok, Jakarta, Kuala Lumpur and Manila were not so successful. It draws Singapore's experiences where some TDM measures work effectively to maintain sustainable urban transportation. It then raises some research questions regarding the social feasibility of TDM in some Southeast Asian Cities.

Some important findings of this research, in connection with the research questions, are as follows:

- Reactions (policies) toward car ownership and use hold important position in determining the path of city's urban transportation. The experiences of Southeast Asian Cities explored in this research reveal that in the cities where car ownership and use are essentially left to grow uncontrolled, transportation problems such as traffic congestion and environmental degradation are more severely perceived. Singapore was the only city in the study area that had adopted restraint policies from the early era of its development phase. Consistent devotion to restraint policies has helped the city to control car dependency and, in parallel with that, to channel travel demand to a more sustainable mode.

- Later realization to control excessive car ownership and use, as in the case of Bangkok, Jakarta, Kuala Lumpur and Manila, was found to be more difficult. This is because, among others, car owners and users have become captive with car use and hence would tend to see another alternative as inferior one to their automobile. Nevertheless, it is also indicated, when mobility problems are so severely perceived, that people generally agree to the idea of limiting traffic volume in their road network. This fact was shown throughout the study area (i.e. Bangkok, Jakarta, Kuala Lumpur, and Manila). This sheds the light on the importance of problem awareness to the anticipation of a problem solving program.

- Despite the above general agreement, people's readiness to accept a more specified restraint program is still in question. This can be inferred from the low acceptability levels toward three hypothetical measures presented in this study. Therefore, a TDM program has to be designed very carefully and communicated in a convincing way to show its position as a cure for the prevailing situations. In this context, special attention should be given to the successful case of Manila, where majority of respondents were convinced of the role of the UVVRP, and hence support the program as a way to lessen traffic congestion.

- Throughout the study area, there are some aspects that are found as determinants of people's acceptability toward a TDM program. These include social pressure from one's important others (i.e. friends, family, colleague, etc.) to support the program, perceived fairness (personal expectation outcome), perceived effectiveness, and subjective knowledge about the program. To a lesser extent, acceptability toward TDM programs is also influenced by transportation problem awareness, internal attribution of responsibility for the solution of the perceived problems, and one's important mobility aims to reach.

- The aforementioned aspects were also found out to be inter-correlated among each other. Social pressure to support TDM measures was found as an influential aspect to acceptability as well as to the evaluation of effectiveness, outcome expectation, and intention to drive less and to shift to alternative modes. Two socioeconomic factors, i.e. income level and car as primary moving modus, were found to influence the formation of one's dependency toward car use.

7.2. CONCLUDING REMARKS

The fact that many transportation studies have been constantly suggesting the governments of Bangkok, Jakarta, Manila and Kuala Lumpur to seriously consider car use and ownership restraining programs is well known. Indeed it has been widely realized by the planners that such programs are urgently required for implementation to curb the imbalance of transportation demand and supply. Unfortunately, many of the suggestions have remained unused upon the shelves, and some attempts to realize such suggestions have been fiercely opposed by the public.

In connection with this fact, the remaining research question asks how people's acceptability of TDM measures could be increased. This research has therefore suggested a structural model that contains some aspects that play important roles in determining public acceptability toward some TDM measures. If these aspects could be changed in a favorable way, acceptability of TDM measures may be expected. It has to be realized, however, that there are no simple solutions for obtaining acceptability of TDM measures. Effective communications, social modeling and education programs are needed to change the prevailing norms and attitudes. On the other hand, convincing TDM programs that provide people with decent alternatives to their private cars have to be made through a careful planning.

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Appendix

Questionnaire Survey

Public Acceptability Questionnaire

ASEAN University Network – Japan International Cooperation Agency | Transportation Research Laboratory – Chulalongkorn University, Thailand | Transportation Eng. Division De La Salle University Manila, Philippines

Good Morning/Afternoon,

We are carrying out a survey about transport and traffic issues in some ASEAN capitals as a part of a research project for the JICA's AUN/SEED-Net. Your help would be very valuable for the success of this research-project.

The project is investigating public attitude to potential transport policies in four ASEAN cities: Bangkok, Manila, Jakarta, and Kuala Lumpur. By answering this questionnaire, you help us to make sure that all pertinent viewpoints get a fair representation in the research.

Your answer will be treated with utmost confidentiality. The collected data will be used for research purposes only; no single respondent can be identified from the results. If you have any questions about this survey, please contact:

Please mark (X) a cell of the following five-cell attitudinal scales that best reflects your personal opinions.

1. Below, we list some of **transportation problems** commonly found in urban areas. In the white cells, please guess how would *your society* perceive the severity of such problems. In the gray cells, we need you to state to what degree the problems affect you *personally*.

	the society likely perceives it…							as for **myself**, I am personally…						
• Traffic jam	negligible problem						very serious problem	not affected						seriously affected
• Inadequate parking spaces	negligible problem						very serious problem	not affected						seriously affected
• Inadequate public transportation	negligible problem						very serious problem	not affected						seriously affected
• Air pollution from motor vehicles	negligible problem						very serious problem	not affected						seriously affected
• Traffic noise	negligible problem						very serious problem	not affected						seriously affected
• Unsafe roads	negligible problem						very serious problem	not affected						seriously affected

2. What do you think about the state of these problems over the **next 5 years**?

• Traffic jam	worse						better
• Inadequate parking spaces	worse						better
• Inadequate public transport	worse						better
• Air pollution from motor vehicles	worse						better
• Traffic noise	worse						better
• Unsafe roads	worse						better

3. Do you think there is a need to *limit the amount of traffic volume* in your city's road network?

not at all						certainly

4. Please evaluate to what degree you think the following parties have responsibility for resolving transportation problems in your city.

• National government	not responsible						largely responsible
• Municipal authority (LGU)	not responsible						largely responsible
• Motorists	not responsible						largely responsible
• You (yourself)	not responsible						largely responsible
• Scientists/engineers	not responsible						largely responsible
• City bus/Jeepney companies	not responsible						largely responsible
• Taxi companies	not responsible						largely responsible
• Traffic Police officers	not responsible						largely responsible

5. Please evaluate the importance of the following ideas according to *your personal interest*

• I want to use my car whenever I like	Unimportant						Very important
• The air quality in my city should be better	Unimportant						Very important
• I would like to go by car to any place I want	Unimportant						Very important
• Traveling within the city should be cheap	Unimportant						Very important
• All transport users should be treated equally	Unimportant						Very important
• I would like to be by myself if I go by car	Unimportant						Very important
• The city center should be more welcome to pedestrians	Unimportant						Very important
• There should be more bicycle routes	Unimportant						Very important
• Traffic safety should be improved	Unimportant						Very important
• I would like to go to any place I want within the city no matter which transport mode (bus, rail-transit, bicycle, etc) I use.	Unimportant						Very important

There exist many strategies to improve traffic situation in the city. Some of them are given below with brief illustrations.

Strategy	Remarks
Improvement of public transport performance	For example: public transport integration, quality and reliability improvement, lowering ticket price, etc.
Road pricing	Charging vehicle-users for using the road network at a city center, by either fixed charge or variable charge.
Increased parking charges	Increasing the cost of parking in a city-center
Zone access controls	Selectively or thoroughly banning private cars from accessing a city center/congested areas

We now present some possible packages of strategies. Please consider and then answer a few questions related to each of these packages.

Package A:

(1) Improve public transport/transit/rideshare services

(2) Impose zone access control measure on congested areas (like Ayala CBD) with the following scheme: From Monday to Friday, 7.00 am to 9.00 am (morning peak) and 4.00 pm to 7.00 pm (evening peak), access to congested areas is granted only for public transportation and private cars with at least three passengers in one car.

(3) Increase the cost of parking in congested areas (like Ayala CBD) by 100% increase.

6.1. Have you ever heard about package *A* before?

nothing at all ☐☐☐☐☐ a lot

6.2. How effective do you think this package will be in reducing the amount of vehicular traffic in Metro Manila?

will not work at all ☐☐☐☐☐ will work effectively

6.3. How acceptable would you say about this package if it would be imposed in Metro Manila?

absolutely unacceptable ☐☐☐☐☐ totally acceptable

6.4. If package *A* were to impose, compared to the present situation and all things considered, you think this would be…

to your disadvantage ☐☐☐☐☐ to your advantage

6.5. Do you think that your closest (family, friends, colleagues) would think that you should support for this package?

very unlikely ☐☐☐☐☐ very likely

6.6. If the package *A* were to impose in your city, how it would likely affect your travel behavior?

I would...

- drive my car less — certainly not ☐☐☐☐☐ certainly yes
- use public transport (bus, jeepney, LMRT, etc.) more often — certainly not ☐☐☐☐☐ certainly yes
- use my bicycle more or walk more — certainly not ☐☐☐☐☐ certainly yes
- take a part/join in car-sharing program — certainly not ☐☐☐☐☐ certainly yes
- try to fill in my car extra passengers and drive as usual in the restricted area — certainly not ☐☐☐☐☐ certainly yes
- avoid driving the routes where the access restriction is imposed — certainly not ☐☐☐☐☐ certainly yes
- park inside the restricted area and pay the parking charge (given I have 3 or more people in my car) — certainly not ☐☐☐☐☐ certainly yes
- support a movement to stop the strategy — certainly not ☐☐☐☐☐ certainly yes
- park my car just beyond the restricted area and use public transport to travel within that area — certainly not ☐☐☐☐☐ certainly yes

---

Package B:

(1) Improve public transport/transit/rideshare services

(2) Impose zone access control measure on congested areas (like Ayala CBD) with the following scheme:

Access to congested areas is not granted (prohibited) in Monday for private vehicles with the *last* plate-license number being 0 and 1; in Tuesday for 2 and 3; in Wednesday for 4 and 5; in Thursday for 6 and 7; and in Friday for 8 and 9. In Saturday and Sunday, access for all private cars is granted.

(3) Increase the cost of parking in congested areas (like Ayala CBD) by 100% increase

7.1. Have you ever heard about package *B* before?

nothing at all ☐☐☐☐☐ a lot

7.2. How effective do you think this package will be in reducing the amount of vehicular traffic in your city?

will not work at all ☐☐☐☐☐ will work effectively

7.3. How acceptable would you say about this package if it would be imposed in your city?

absolutely unacceptable ☐☐☐☐☐ totally acceptable

7.4. If package *B* were imposed, compared to the present situation and all things considered, you think this would be…

to your disadvantage	☐ ☐ ☐ ☐ ☐	to your advantage

7.5. Do you think that your closest (family, friends, colleagues) would think that you should support for this package?

very unlikely	☐ ☐ ☐ ☐ ☐	very likely

7.6. Given the package *B* being introduced in your city, how it would likely affect your travel behavior?

I would...

• drive my car as usual whenever the access is granted	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• use public transport (bus, jeepney, M/LRT, etc.) more often	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• use bicycle or walk more often	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• drive less even during the days allowable to drive	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• take part/join in car-sharing or car-pooling programs	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• buy a second car with different plate-number ending to allow me drive more	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• park my car as usual (within the restricted area) when the access is granted	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• support a movement to stop the strategy	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• park my car just beyond the restricted area and use public transport to travel within that area (when the access is granted)	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes

---

Package C:
(1) Improve public transport/transit/rideshare services
(2) Charge private vehicles a fixed-price charge of P55 for accessing congested areas (like Ayala CBD).
(3) Increase the cost of parking cars in congested areas by 50% increase.

8.1. Have you ever heard about package *C* before?

nothing at all	☐ ☐ ☐ ☐ ☐	a lot

8.2. How effective do you think this package will be in reducing the amount of vehicular traffic in Metro Manila?

will not work at all	☐ ☐ ☐ ☐ ☐	will work effectively

8.3. How acceptable would you say about this package if it would be imposed in Metro Manila?

absolutely unacceptable	☐ ☐ ☐ ☐ ☐	totally acceptable

8.4. If package *C* were imposed, compared to the present situation and all things considered, you think this would be…

to your disadvantage	☐ ☐ ☐ ☐ ☐	to your advantage

8.5. Do you think that your closest (family, friends, colleagues) would think that you should support for this package?

very unlikely	☐ ☐ ☐ ☐ ☐	very likely

8.6. Given the package *C* being introduced in your city, how it would likely affect your travel behavior?

I would...

• drive less	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes
• use public transport (bus, jeepney, L/MRT, etc.) more often	certainly not	☐ ☐ ☐ ☐ ☐	certainly yes

• use my bicycle or walk more	certainly not						certainly yes
• take part/join in car-sharing or car pooling program	certainly not						certainly yes
• pay the charges and drive/park as usual	certainly not						certainly yes
• support a movement to stop the strategy	certainly not						certainly yes
• ask my company/employer to reimburse my expenses on those charges	certainly not						certainly yes
• support a movement to organize office-bus/school-bus	certainly not						certainly yes

9. Packages of policies above will somehow help to raise public fund, which in turn may be spent in a number of ways. Below, we present some alternatives. In the white cells, please indicate *your* support on how the money *should* be spent. In the gray cells, we ask you to state *how you think* the *authority/government* will use the money.

	The money should be used...							*The authority will use the money...*						
• for supporting municipal/LGU budget in general	totally disagree						totally agree	No						Yes
• for traffic flow improvements (expanding roads, traffic signals, etc.)	totally disagree						totally agree	No						Yes
• for reducing public transport fares	totally disagree						totally agree	No						Yes
• for improving public transport quality	totally disagree						totally agree	No						Yes
• for lowering income taxes	totally disagree						totally agree	No						Yes
• for reducing vehicle-ownership taxes	totally disagree						totally agree	No						Yes
• for improving the conditions for pedestrians and bicyclists	totally disagree						totally agree	No						Yes

10. Overall, what would you expect if you had to pay more to drive your car (compared with the present situation)?

I would expect...

• shorter travel time in the city center	certainly not						certainly yes
• to be more strongly affected by the increased costs than most other people	certainly not						certainly yes
• less environmental problems to my city	certainly not						certainly yes
• more effort to plan my trips	certainly not						certainly yes
• a nicer city center	certainly not						certainly yes
• additional travel costs to my budget	certainly not						certainly yes
• unfair restriction to my travel possibilities	certainly not						certainly yes
• safer road network for all	certainly not						certainly yes
• to be unfairly forced to bear the costs of city improvement projects	certainly not						certainly yes

11. To what extent do you agree with the following statement?

"It would be so difficult to reduce substantially my trips in the city using my car" — strongly disagree ☐☐☐☐☐ strongly agree

12. Do you think that car driving in future will become considerably more expensive?

not at all ☐☐☐☐☐ certainly

13. If driving in the city became more expensive, how would this affect your use of car for different activities?

- for work/school trips — I will drive as many as usual ☐☐☐☐☐ I will drive substantially less
- for shopping trips — I will drive as many as usual ☐☐☐☐☐ I will drive substantially less
- for leisure/social trips — I will drive as many as usual ☐☐☐☐☐ I will drive substantially less

14. Please share with us some of your personal information (by marking "X" on the appropriate choice)

You are:	O Female O Male	Your employment status:	O Government officials O Self employed O Work for private company O Unemployed O Student O Retirement O Other: ______
Last formal education attended:	O Elementary school or below O Secondary/High school O Vocational school O Collge/Undergraduate studies O Graduate/doctoral studies		
Your age is:	years old	How many persons live in your household:	
Do you have car:	O yes O no	How many persons in your household are younger than 18 years old:	
You live:	O within the City of Manila O within Metro-Manila Region O out of Metro Manila Region		
You work /go to school:	O within the City of Manila O within Metro-Manila Region		
What is your household's gross income per month?	O P 3000 or less O P 3001 to 6000 O P 6001 to 10000 O P 10001 to 15000 O P 15001 to 20000 O P 20001 to 30000 O P 30001 or more	How do you usually go to work/school (state primary mode only):	O Private car (I drive) O Share car with my family/others O School-bus/office-bus O Public transport (bus, LRT, taxi, etc) O Bicycle/non-motorized vehicle O Walk

Thank you very much for your cooperation.

Ordered Probit Models for Acceptability of the Proposed TDM Policies

Model 1A: Acceptability of Package A in Bangkok

```
Iteration 0:   log likelihood = -248.93967
Iteration 1:   log likelihood = -183.23556
Iteration 2:   log likelihood = -180.33442
Iteration 3:   log likelihood = -180.26993
Iteration 4:   log likelihood = -180.26988

Ordered probit estimates                          Number of obs   =    196
                                                  LR chi2(14)     = 137.34
                                                  Prob > chi2     = 0.0000
Log likelihood = -180.26988                       Pseudo R2       = 0.2758
```

acc_a	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_a	.1620665	.0819667	1.98	0.048	.0014147	.3227183
eff_a	.3389466	.0865378	3.92	0.000	.1693358	.5085575
adv_a	.3693812	.1393945	2.65	0.008	.096173	.6425894
snorm_a	.6237082	.1486779	4.20	0.000	.3323049	.9151116
fppp_mob	-.0392407	.1519317	-0.26	0.796	-.3370215	.25854
fppp_env	.1783856	.1373588	1.30	0.194	-.0908327	.4476038
faimcar	.1808341	.10597	1.71	0.088	-.0268632	.3885314
fatr_slf	-.1449575	.0752719	-1.93	0.054	-.2924878	.0025727
sex	-.2094783	.1854625	-1.13	0.259	-.572978	.1540215
educ01	.4056087	.3077178	1.32	0.187	-.1975071	1.008725
age	.0162239	.0112756	1.44	0.150	-.0058758	.0383237
inc	.0789884	.0686085	1.15	0.250	-.0554818	.2134587
nhh	.0388002	.0476778	0.81	0.416	-.0546466	.132247
mod_car	-.3874976	.2271003	-1.71	0.088	-.8326059	.0576108
_cut1	-.6556201	.6338552	(Ancillary parameters)			
_cut2	.717041	.641294				
_cut3	3.032558	.6774407				
_cut4	3.866116	.6807128				

Model 2A: Acceptability of Package A in Jakarta

```
Iteration 0:   log likelihood = -135.48546
Iteration 1:   log likelihood = -86.844962
Iteration 2:   log likelihood = -82.738257
Iteration 3:   log likelihood =  -82.51324
Iteration 4:   log likelihood = -82.512145

Ordered probit estimates                          Number of obs   =     92
                                                  LR chi2(14)     = 105.95
                                                  Prob > chi2     = 0.0000
Log likelihood = -82.512145                       Pseudo R2       = 0.3910
```

acc_a	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_a	.4799909	.1217743	3.94	0.000	.2413177	.7186641
eff_a	.7032216	.1755657	4.01	0.000	.3591191	1.047324
adv_a	.7918053	.1705089	4.64	0.000	.4576139	1.125997
snorm_a	.308588	.1556728	1.98	0.047	.0034748	.6137012
fppp_mob	-.1822255	.1554712	-1.17	0.241	-.4869434	.1224924
fppp_env	-.1780922	.1724797	-1.03	0.302	-.5161463	.1599619
faimcar	-.0731217	.1504586	-0.49	0.627	-.3680152	.2217717
fatr_slf	-.2705904	.194919	-1.39	0.165	-.6526247	.1114439
sex	-.6031551	.3023593	-1.99	0.046	-1.195768	-.0105418
educ01	-.2633895	.3854541	-0.68	0.494	-1.018866	.4920867
age	.0167764	.0176008	0.95	0.341	-.0177205	.0512733
inc	.0483441	.080331	0.60	0.547	-.1091019	.20579
nhh	.0651212	.0779041	0.84	0.403	-.0875681	.2178104

```
    mod_car |   .3159067   .3233261     0.98   0.329    -.3178007    .9496141
------------+----------------------------------------------------------------
      _cut1 |   .4243559   .8832813          (Ancillary parameters)
      _cut2 |   2.093721   .8961889
      _cut3 |   4.119576   .9784959
      _cut4 |   5.332702    1.03325
-----------------------------------------------------------------------------
```

Model 3A: Acceptability of Package A in Kuala Lumpur

```
      Iteration 0:   log likelihood = -200.80941
      Iteration 1:   log likelihood = -128.76062
      Iteration 2:   log likelihood = -123.33097
      Iteration 3:   log likelihood = -123.04382
      Iteration 4:   log likelihood = -123.04189
      Iteration 5:   log likelihood = -123.04189

      Ordered probit estimates                          Number of obs   =     136
                                                        LR chi2(14)     =  155.54
                                                        Prob > chi2     =  0.0000
      Log likelihood = -123.04189                       Pseudo R2       =  0.3873

-----------------------------------------------------------------------------
      acc_a |      Coef.   Std. Err.       z     P>|z|     [95% Conf. Interval]
------------+----------------------------------------------------------------
     info_a |   .2987938   .0964761     3.10   0.002     .1097041    .4878835
      eff_a |   .4397059   .1194601     3.68   0.000     .2055684    .6738435
      adv_a |   .6087485   .1370189     4.44   0.000     .3401963    .8773006
    snorm_a |   .3381097   .1339988     2.52   0.012     .0754768    .6007426
   fppp_mob |   -.109037   .0942331    -1.16   0.247    -.2937304    .0756564
   fppp_env |  -.1055108   .1010749    -1.04   0.297     -.303614    .0925924
    faimcar |  -.0576553   .1161688    -0.50   0.620    -.2853419    .1700313
   fatr_slf |  -.0578461   .1378914    -0.42   0.675    -.3281083    .2124161
        sex |  -.4749336   .2257611    -2.10   0.035    -.9174172   -.0324499
     educ01 |    .113941   .2418956     0.47   0.638    -.3601656    .5880477
        age |   .0105857   .0169642     0.62   0.533    -.0226635    .0438348
        inc |     .07301   .0929013     0.79   0.432    -.1090731    .2550931
        nhh |  -.0589308   .0552965    -1.07   0.287    -.1673099    .0494484
    mod_car |   .1135541   .2815446     0.40   0.687    -.4382632    .6653713
------------+----------------------------------------------------------------
      _cut1 |  -.3881446   .6076086          (Ancillary parameters)
      _cut2 |   .9412017   .6077999
      _cut3 |   2.801574   .6262159
      _cut4 |   4.473535   .6922759
-----------------------------------------------------------------------------
```

Model 4A: Acceptability of Package A in Manila

```
      Iteration 0:   log likelihood = -251.53829
      Iteration 1:   log likelihood = -198.62217
      Iteration 2:   log likelihood =  -197.3764
      Iteration 3:   log likelihood = -197.36641
      Iteration 4:   log likelihood = -197.36641

      Ordered probit estimates                          Number of obs   =     184
                                                        LR chi2(14)     =  108.34
                                                        Prob > chi2     =  0.0000
      Log likelihood = -197.36641                       Pseudo R2       =  0.2154

-----------------------------------------------------------------------------
      acc_a |      Coef.   Std. Err.       z     P>|z|     [95% Conf. Interval]
------------+----------------------------------------------------------------
     info_a |   .1137433   .0663789     1.71   0.087    -.0163569    .2438436
      eff_a |   .2388116   .0943153     2.53   0.011     .0539569    .4236662
      adv_a |   .3099461   .0922964     3.36   0.001     .1290484    .4908438
    snorm_a |    .327758   .0976778     3.36   0.001      .136313     .519203
   fppp_mob |   .0649936   .0858474     0.76   0.449    -.1032642    .2332513
   fppp_env |   .2102426   .0911052     2.31   0.021     .0316797    .3888055
    faimcar |  -.1092665   .0981308    -1.11   0.266    -.3015994    .0830664
```

fatr_slf	.06127	.1078278	0.57	0.570	-.1500685	.2726086
sex	-.1787442	.1846293	-0.97	0.333	-.540611	.1831226
educ01	-.6231167	.3440463	-1.81	0.070	-1.297435	.0512016
age	.001824	.0069688	0.26	0.794	-.0118346	.0154825
inc	.014471	.063803	0.23	0.821	-.1105806	.1395226
nhh	.0194414	.0315912	0.62	0.538	-.0424762	.081359
mod_car	.0883989	.1824651	0.48	0.628	-.2692261	.446024
_cut1	-1.648099	.5996201	(Ancillary parameters)			
_cut2	-.2845672	.5805422				
_cut3	1.175637	.5860922				
_cut4	2.984899	.6415577				

Model 5A: Pooled model for Acceptability of Package A

```
Iteration 0:   log likelihood = -859.59703
Iteration 1:   log likelihood = -645.22878
Iteration 2:   log likelihood = -638.23117
Iteration 3:   log likelihood = -638.15331
Iteration 4:   log likelihood =  -638.1533

Ordered probit estimates                          Number of obs   =      611
                                                  LR chi2(13)     =   442.89
                                                  Prob > chi2     =   0.0000
Log likelihood =  -638.1533                       Pseudo R2       =   0.2576
```

acc_a	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_a	.2074326	.0380501	5.45	0.000	.1328558	.2820094
eff_a	.3318507	.0470078	7.06	0.000	.2397172	.4239842
adv_a	.4041697	.0544705	7.42	0.000	.2974094	.5109299
snorm_a	.3525031	.0570456	6.18	0.000	.2406958	.4643105
fppp_mob	-.0264936	.0478066	-0.55	0.579	-.1201928	.0672055
fppp_env	.0823968	.0473704	1.74	0.082	-.0104475	.175241
faimcar	-.0487998	.0476442	-1.02	0.306	-.1421808	.0445812
fatr_slf	-.0306521	.0465412	-0.66	0.510	-.1218712	.0605671
sex	-.2884417	.0974601	-2.96	0.003	-.4794599	-.0974234
educ01	-.0471331	.1245543	-0.38	0.705	-.291255	.1969889
age	.0093105	.0047981	1.94	0.052	-.0000935	.0187146
nhh	-.0043796	.018867	-0.23	0.816	-.0413581	.032599
mod_car	.0199745	.1029718	0.19	0.846	-.1818466	.2217956
_cut1	-.9407775	.258149	(Ancillary parameters)			
_cut2	.3212828	.2538133				
_cut3	2.082214	.2634079				
_cut4	3.325155	.279766				

Summary of Models 1A to 5A

Variable	BKK_A	JKT_A	KUL_A	MNL_A	ALL_A
info_a	.16206649*	.47999092***	.29879378**	.11374335	.20743259***
eff_a	.33894665***	.70322161***	.43970594***	.23881159*	.33185072***
adv_a	.3693812**	.79180527***	.60874846***	.3099461***	.40416967***
snorm_a	.62370822***	.30858801*	.3381097*	.32775799***	.35250312***
fppp_mob	-.03924074	-.18222548	-.10903702	.06499356	-.02649365
fppp_env	.17838556	-.17809218	-.1055108	.21024257*	.08239677
faimcar	.18083407	-.07312174	-.05765528	-.10926646	-.04879978
fatr_slf	-.14495753	-.27059043	-.05784612	.06127003	-.03065206
sex	-.20947829	-.60315507*	-.47493357*	-.17874422	-.28844167**
educ01	.40560872	-.26338945	.11394104	-.6231167	-.04713306
age	.01622393	.01677638	.01058565	.00182397	.00931051
inc	.07898844	.04834408	.07301004	.01447102	
nhh	.03880023	.06512118	-.05893075	.01944138	-.00437957
mod_car	-.38749755	.31590669	.11355406	.08839893	.01997454

legend: * p<0.05; ** p<0.01; *** p<0.001

Model 1B: Acceptability of Package B in Bangkok

Iteration 0: log likelihood = -266.57818
Iteration 1: log likelihood = -210.50343
Iteration 2: log likelihood = -208.61565
Iteration 3: log likelihood = -208.57321
Iteration 4: log likelihood = -208.57307
Iteration 5: log likelihood = -208.57307

Ordered probit estimates — Number of obs = 196; LR chi2(14) = 116.01; Prob > chi2 = 0.0000

Log likelihood = -208.57307 — Pseudo R2 = 0.2176

acc_b	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_b	-.0201249	.0776751	-0.26	0.796	-.1723652	.1321154
eff_b	.7131236	.1048583	6.80	0.000	.5076051	.9186421
adv_b	.0013706	.1556272	0.01	0.993	-.3036532	.3063944
snorm_b	.7213642	.171097	4.22	0.000	.3860202	1.056708
fppp_mob	.1502951	.1410064	1.07	0.286	-.1260723	.4266626
fppp_env	.0924515	.125871	0.73	0.463	-.1542511	.3391541
faimcar	.2658399	.1094149	2.43	0.015	.0513906	.4802892
fatr_slf	-.0333398	.0689952	-0.48	0.629	-.1685679	.1018883
sex	.4557873	.1778125	2.56	0.010	.1072813	.8042933
educ01	.255304	.2911949	0.88	0.381	-.3154274	.8260354
age	.0163345	.0107477	1.52	0.129	-.0047307	.0373996
inc	.0771705	.0721922	1.07	0.285	-.0643237	.2186646
nhh	.0009337	.047396	0.02	0.984	-.0919607	.0938282
mod_car	-.6840417	.2377305	-2.88	0.004	-1.149985	-.2180984
_cut1	.6067869	.5889767	(Ancillary parameters)			
_cut2	1.708318	.5932866				
_cut3	3.436478	.62234				
_cut4	4.617318	.6941602				

Model 2B: Acceptability of Package B in Jakarta

Iteration 0: log likelihood = -134.50593
Iteration 1: log likelihood = -89.373373
Iteration 2: log likelihood = -86.243604
Iteration 3: log likelihood = -86.151407
Iteration 4: log likelihood = -86.151278

Ordered probit estimates — Number of obs = 92; LR chi2(14) = 96.71; Prob > chi2 = 0.0000

Log likelihood = -86.151278 — Pseudo R2 = 0.3595

acc_b	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_b	.1561996	.1087159	1.44	0.151	-.0568796	.3692788
eff_b	.7276317	.1465986	4.96	0.000	.4403038	1.01496
adv_b	.7194585	.1618185	4.45	0.000	.4023	1.036617
snorm_b	.0749571	.1750356	0.43	0.668	-.2681063	.4180205
fppp_mob	-.0783935	.1468089	-0.53	0.593	-.3661337	.2093468
fppp_env	-.3507407	.1761114	-1.99	0.046	-.6959127	-.0055687
faimcar	.0168279	.1454141	0.12	0.908	-.2681784	.3018342
fatr_slf	.1064498	.2024444	0.53	0.599	-.2903339	.5032334
sex	-.6588064	.3097623	-2.13	0.033	-1.265929	-.0516834
educ01	-.5617246	.3796758	-1.48	0.139	-1.305875	.1824263
age	.0161727	.016886	0.96	0.338	-.0169231	.0492686
inc	-.1283208	.0812815	-1.58	0.114	-.2876295	.030988
nhh	-.1076375	.0861706	-1.25	0.212	-.2765287	.0612538
mod_car	-.181573	.2929213	-0.62	0.535	-.7556883	.3925422
_cut1	-2.057081	.8145007	(Ancillary parameters)			

```
      _cut2 |  -.7044184   .7993724
      _cut3 |   1.007835   .8091261
      _cut4 |   2.096582   .8413425
------------------------------------------------------------------------------
```

Model 3B: Acceptability of Package B in Kuala Lumpur

```
      Iteration 0:   log likelihood = -196.00687
      Iteration 1:   log likelihood = -126.30545
      Iteration 2:   log likelihood = -121.12828
      Iteration 3:   log likelihood = -120.85936
      Iteration 4:   log likelihood =  -120.8575
      Iteration 5:   log likelihood =  -120.8575

      Ordered probit estimates                          Number of obs   =    136
                                                        LR chi2(14)     = 150.30
                                                        Prob > chi2     = 0.0000
      Log likelihood =  -120.8575                       Pseudo R2       = 0.3834

------------------------------------------------------------------------------
      acc_b |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     info_b |  -.0323381    .096599    -0.33   0.738    -.2216687    .1569924
      eff_b |   .8656785   .1277745     6.78   0.000     .6152451    1.116112
      adv_b |   .4173459   .1249045     3.34   0.001     .1725376    .6621541
    snorm_b |   .3066134   .1364375     2.25   0.025     .0392008    .5740259
   fppp_mob |  -.0453537   .0966917    -0.47   0.639     -.234866    .1441585
   fppp_env |  -.1235834   .0953937    -1.30   0.195    -.3105515    .0633848
    faimcar |   -.140708   .1140869    -1.23   0.217    -.3643143    .0828982
   fatr_slf |  -.0231649   .1405735    -0.16   0.869     -.298684    .2523541
        sex |  -.3511814    .231825    -1.51   0.130    -.8055501    .1031873
     educ01 |  -.2641299   .2460045    -1.07   0.283    -.7462899    .2180301
        age |  -.0142218    .017322    -0.82   0.412    -.0481722    .0197287
        inc |   .0758602   .0958754     0.79   0.429    -.1120523    .2637726
        nhh |    .065399   .0580464     1.13   0.260    -.0483699    .1791679
    mod_car |  -.0451831   .2879379    -0.16   0.875    -.6095309    .5191647
------------+-----------------------------------------------------------------
      _cut1 |  -.7744985   .5964829          (Ancillary parameters)
      _cut2 |   .5674441   .5838101
      _cut3 |   2.516102     .62319
      _cut4 |   3.880055   .6811794
------------------------------------------------------------------------------
```

Model 4B: Acceptability of Package B in Manila

```
      Iteration 0:   log likelihood = -250.61465
      Iteration 1:   log likelihood = -180.72242
      Iteration 2:   log likelihood = -177.33986
      Iteration 3:   log likelihood = -177.25519
      Iteration 4:   log likelihood = -177.25509

      Ordered probit estimates                          Number of obs   =    184
                                                        LR chi2(14)     = 146.72
                                                        Prob > chi2     = 0.0000
      Log likelihood = -177.25509                       Pseudo R2       = 0.2927

------------------------------------------------------------------------------
      acc_b |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     info_b |   .2093824   .0624197     3.35   0.001      .087042    .3317228
      eff_b |   .3861957   .1114823     3.46   0.001     .1676943     .604697
      adv_b |   .2785569     .12818     2.17   0.030     .0273286    .5297851
    snorm_b |    .547548   .1283175     4.27   0.000     .2960504    .7990456
   fppp_mob |   .0128223   .0883031     0.15   0.885    -.1602486    .1858932
   fppp_env |   .0589143   .0936021     0.63   0.529    -.1245425    .2423711
    faimcar |    .037537   .1004357     0.37   0.709    -.1593134    .2343873
   fatr_slf |   .1691279   .1107386     1.53   0.127    -.0479158    .3861716
        sex |    .038089   .1904819     0.20   0.842    -.3352486    .4114267
     educ01 |  -1.195359    .372897    -3.21   0.001    -1.926224   -.4644943
```

```
         age |   .0123521   .0073441     1.68   0.093     -.002042    .0267462
         inc |  -.1281084   .0679983    -1.88   0.060    -.2613826    .0051657
         nhh |   .0498045   .0322719     1.54   0.123    -.0134473    .1130563
     mod_car |   .2691671    .192657     1.40   0.162    -.1084336    .6467678
-------------+----------------------------------------------------------------
       _cut1 |  -2.167455   .6688471          (Ancillary parameters)
       _cut2 |  -1.159623   .6321323
       _cut3 |   .5816103   .6305055
       _cut4 |    2.26125   .6427053
------------------------------------------------------------------------------
```

Model 5B: Pooled Model for Acceptability of Package B

```
      Iteration 0:   log likelihood = -913.74528
      Iteration 1:   log likelihood =  -654.0227
      Iteration 2:   log likelihood = -643.38552
      Iteration 3:   log likelihood =  -643.2277
      Iteration 4:   log likelihood = -643.22765

      Ordered probit estimates                          Number of obs   =    611
                                                        LR chi2(13)     = 541.04
                                                        Prob > chi2     = 0.0000
      Log likelihood = -643.22765                       Pseudo R2       = 0.2961

------------------------------------------------------------------------------
      acc_b |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     info_b |   .1361773    .035838     3.80   0.000     .0659361    .2064186
      eff_b |   .5646773   .0495147    11.40   0.000     .4676303    .6617244
      adv_b |   .3560531   .0622659     5.72   0.000     .2340142    .4780919
    snorm_b |   .3604929   .0627229     5.75   0.000     .2375582    .4834276
   fppp_mob |  -.0201198   .0483332    -0.42   0.677    -.1148511    .0746115
   fppp_env |  -.0113683   .0473883    -0.24   0.810    -.1042476    .0815111
    faimcar |   .0002849   .0475306     0.01   0.995    -.0928734    .0934431
   fatr_slf |    .047034   .0462113     1.02   0.309    -.0435384    .1376065
        sex |   .0001197   .0967409     0.00   0.999    -.1894889    .1897283
     educ01 |   -.202585    .126187    -1.61   0.108     -.449907    .0447371
        age |    .006434   .0048114     1.34   0.181    -.0029962    .0158641
        nhh |     .04426   .0196032     2.26   0.024     .0058385    .0826815
    mod_car |  -.0604922   .1037685    -0.58   0.560    -.2638748    .1428903
------------+-----------------------------------------------------------------
      _cut1 |  -.3566389   .2487888          (Ancillary parameters)
      _cut2 |   .7195479    .248447
      _cut3 |   2.325248   .2599908
      _cut4 |   3.681233   .2816357
------------------------------------------------------------------------------
```

Summary of Models 1B to 5B

```
----------------------------------------------------------------------------------
Variable |     BKK_B         JKT_B         KUL_B          MNL_B          ALL_B
---------+------------------------------------------------------------------------
  info_b | -.02012489     .15619962    -.03233812     .20938237***   .13617731***
   eff_b |  .71312357***  .72763173***  .86567846***  .38619565***   .56467734***
   adv_b |  .0013706      .71945852***  .41734585***  .27855688*     .35605309***
 snorm_b |  .72136418***  .0749571      .30661339*    .54754801***   .36049291***
fppp_mob |  .15029515    -.07839347    -.04535372     .01282229     -.02011983
fppp_env |  .09245149    -.35074075*   -.12358338     .05891431     -.01136827
 faimcar |  .26583992*    .0168279     -.14070804     .03753696      .00028488
fatr_slf | -.0333398      .10644976    -.02316495     .16912789      .04703401
     sex |  .45578726*   -.65880641*   -.35118144     .03808902      .0001197
  educ01 |  .25530401    -.56172456    -.26412991   -1.1953591**    -.20258496
     age |  .01633446     .01617273    -.01422175     .01235206      .00643396
     inc |  .07717048    -.12832075     .07586016    -.12810843
     nhh |  .00093371    -.10763747     .065399       .04980449      .04426*
 mod_car | -.68404167**  -.18157304    -.04518309     .26916707     -.06049224
----------------------------------------------------------------------------------
                                          legend: * p<0.05; ** p<0.01; *** p<0.001
```

Model 1C: Acceptability of Package C in Bangkok

```
Iteration 0:   log likelihood = -292.19013
Iteration 1:   log likelihood = -204.07816
Iteration 2:   log likelihood =  -197.9337
Iteration 3:   log likelihood =  -197.5963
Iteration 4:   log likelihood = -197.59446
Iteration 5:   log likelihood = -197.59446

Ordered probit estimates                          Number of obs   =    196
                                                  LR chi2(14)     = 189.19
                                                  Prob > chi2     = 0.0000
Log likelihood = -197.59446                       Pseudo R2       = 0.3237
```

acc_c	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_c	.192707	.0880796	2.19	0.029	.020074	.3653399
eff_c	-.0272959	.0744713	-0.37	0.714	-.173257	.1186651
adv_c	-.0198067	.1351277	-0.15	0.883	-.2846521	.2450388
snorm_c	1.216951	.1517402	8.02	0.000	.9195461	1.514357
fppp_mob	.3836001	.1425267	2.69	0.007	.1042529	.6629473
fppp_env	.2786987	.1367386	2.04	0.042	.010696	.5467015
faimcar	-.145633	.106547	-1.37	0.172	-.3544612	.0631952
fatr_slf	.1990137	.0681254	2.92	0.003	.0654903	.332537
sex	-.4540594	.1908291	-2.38	0.017	-.8280775	-.0800413
educ01	-.2893521	.2939515	-0.98	0.325	-.8654864	.2867822
age	-.0393855	.0113589	-3.47	0.001	-.0616485	-.0171224
inc	.0380559	.0688461	0.55	0.580	-.09688	.1729919
nhh	-.0515324	.0489854	-1.05	0.293	-.1475421	.0444772
mod_car	.3879809	.2236774	1.73	0.083	-.0504187	.8263805
_cut1	-3.351761	.6519809	(Ancillary parameters)			
_cut2	-2.157738	.6419875				
_cut3	-.194202	.6246261				
_cut4	.6413445	.6207138				

Model 2C: Acceptability of Package C in Jakarta

```
Iteration 0:   log likelihood = -132.78836
Iteration 1:   log likelihood = -81.649869
Iteration 2:   log likelihood =  -77.16559
Iteration 3:   log likelihood = -76.865949
Iteration 4:   log likelihood = -76.863463
Iteration 5:   log likelihood = -76.863463

Ordered probit estimates                          Number of obs   =     92
                                                  LR chi2(14)     = 111.85
                                                  Prob > chi2     = 0.0000
Log likelihood = -76.863463                       Pseudo R2       = 0.4212
```

acc_c	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_c	.2532428	.1395485	1.81	0.070	-.0202672	.5267529
eff_c	.6110889	.1752565	3.49	0.000	.2675925	.9545852
adv_c	.0829154	.19076	0.43	0.664	-.2909674	.4567981
snorm_c	1.004725	.2129381	4.72	0.000	.5873736	1.422075
fppp_mob	.0783555	.1456786	0.54	0.591	-.2071692	.3638802
fppp_env	-.2001507	.1785473	-1.12	0.262	-.550097	.1497956
faimcar	-.0555471	.1428833	-0.39	0.697	-.3355933	.2244991
fatr_slf	.0257817	.1927597	0.13	0.894	-.3520205	.4035838
sex	-.6999296	.3176573	-2.20	0.028	-1.322526	-.0773328
educ01	.0387946	.3907736	0.10	0.921	-.7271076	.8046967
age	.0313273	.0176376	1.78	0.076	-.0032418	.0658964
inc	.0402883	.0834843	0.48	0.629	-.123338	.2039146
nhh	.0442803	.0776654	0.57	0.569	-.107941	.1965016
mod_car	.1349415	.3307778	0.41	0.683	-.513371	.783254

```
      _cut1 |   -.654943   .9605299          (Ancillary parameters)
      _cut2 |    1.11802   .9371774
      _cut3 |   3.174653   .9884775
      _cut4 |   4.806388   1.096767
------------------------------------------------------------------------------
```

Model 3C: Acceptability of Package C in Kuala Lumpur

```
      Iteration 0:   log likelihood = -201.69895
      Iteration 1:   log likelihood = -126.43916
      Iteration 2:   log likelihood = -119.81734
      Iteration 3:   log likelihood = -119.21034
      Iteration 4:   log likelihood = -119.19743
      Iteration 5:   log likelihood = -119.19742

      Ordered probit estimates                        Number of obs   =    136
                                                      LR chi2(14)     = 165.00
                                                      Prob > chi2     = 0.0000
      Log likelihood = -119.19742                     Pseudo R2       = 0.4090

------------------------------------------------------------------------------
      acc_c |      Coef.   Std. Err.       z     P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     info_c |     .15005   .0936007     1.60   0.109     -.033404    .3335039
      eff_c |   .7650509   .1231171     6.21   0.000     .5237459    1.006356
      adv_c |   .2468959   .1234765     2.00   0.046     .0048863    .4889055
    snorm_c |   .5951747   .1318651     4.51   0.000     .3367239    .8536255
   fppp_mob |   .1379001   .0961952     1.43   0.152    -.0506389    .3264392
   fppp_env |     .20202   .0977745     2.07   0.039     .0103855    .3936546
    faimcar |  -.3156153   .1176904    -2.68   0.007    -.5462842   -.0849463
   fatr_slf |    -.29869   .1398861    -2.14   0.033    -.5728617   -.0245182
        sex |  -.0244718   .2286351    -0.11   0.915    -.4725882    .4236447
     educ01 |   .3870108   .2427078     1.59   0.111    -.0886877    .8627093
        age |  -.0257615   .0176404    -1.46   0.144    -.0603361    .0088131
        inc |   .1385293   .0952398     1.45   0.146    -.0481372    .3251958
        nhh |  -.0508262   .0559035    -0.91   0.363    -.1603951    .0587427
    mod_car |  -.2090613   .2916357    -0.72   0.473    -.7806567    .3625341
------------+-----------------------------------------------------------------
      _cut1 |  -1.800871    .654041          (Ancillary parameters)
      _cut2 |   .3541731   .5891977
      _cut3 |   1.872999   .6000554
      _cut4 |   3.761389   .6891961
------------------------------------------------------------------------------
```

Model 4C: Acceptability of Package C in Manila

```
      Iteration 0:   log likelihood = -278.64537
      Iteration 1:   log likelihood = -201.73699
      Iteration 2:   log likelihood = -198.52467
      Iteration 3:   log likelihood = -198.48167
      Iteration 4:   log likelihood = -198.48165

      Ordered probit estimates                        Number of obs   =    184
                                                      LR chi2(14)     = 160.33
                                                      Prob > chi2     = 0.0000
      Log likelihood = -198.48165                     Pseudo R2       = 0.2877

------------------------------------------------------------------------------
      acc_c |      Coef.   Std. Err.       z     P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
     info_c |   .0537492   .0906933     0.59   0.553    -.1240065    .2315049
      eff_c |   .4403038   .0849387     5.18   0.000      .273827    .6067805
      adv_c |   .3693812   .1228487     3.01   0.003     .1286021    .6101604
    snorm_c |    .456296   .1213064     3.76   0.000     .2185399    .6940522
   fppp_mob |   .0483707   .0895688     0.54   0.589     -.127181    .2239223
   fppp_env |   .1216505   .0933232     1.30   0.192    -.0612596    .3045606
    faimcar |  -.0648978   .1016392    -0.64   0.523     -.264107    .1343115
   fatr_slf |   .1811198   .1154746     1.57   0.117    -.0452063    .4074459
        sex |   .2730547   .1928282     1.42   0.157    -.1048816     .650991
```

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
educ01	.0303898	.3491557	0.09	0.931	-.6539428	.7147224
age	.0069978	.0072244	0.97	0.333	-.0071618	.0211573
inc	-.0210377	.066056	-0.32	0.750	-.1505051	.1084297
nhh	-.029755	.032005	-0.93	0.353	-.0924836	.0329735
mod_car	.0931106	.1838664	0.51	0.613	-.2672609	.4534821
_cut1	-.5407765	.6155304	(Ancillary parameters)			
_cut2	.574376	.6110674				
_cut3	1.850136	.6256606				
_cut4	3.062578	.6487975				

Model 5C: Pooled model for Acceptability of Package C

```
Iteration 0:   log likelihood = -922.24456
Iteration 1:   log likelihood = -678.66513
Iteration 2:   log likelihood = -670.04477
Iteration 3:   log likelihood = -669.95212
Iteration 4:   log likelihood = -669.95211

Ordered probit estimates                          Number of obs   =     611
                                                  LR chi2(13)     =  504.58
                                                  Prob > chi2     =  0.0000
Log likelihood = -669.95211                       Pseudo R2       =  0.2736
```

acc_c	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
info_c	.1432536	.0437395	3.28	0.001	.0575258	.2289815
eff_c	.2558966	.0420725	6.08	0.000	.1734361	.3383571
adv_c	.1924089	.0599632	3.21	0.001	.0748833	.3099345
snorm_c	.7471457	.061824	12.09	0.000	.6259729	.8683184
fppp_mob	.0924039	.048231	1.92	0.055	-.002127	.1869349
fppp_env	.082511	.0480106	1.72	0.086	-.011588	.17661
faimcar	-.0426366	.0476273	-0.90	0.371	-.1359845	.0507112
fatr_slf	.111091	.0457036	2.43	0.015	.0215137	.2006683
sex	-.1728333	.096597	-1.79	0.074	-.3621599	.0164933
educ01	.0459675	.1267672	0.36	0.717	-.2024916	.2944266
age	-.0015744	.0048781	-0.32	0.747	-.0111353	.0079866
nhh	-.01907	.0191669	-0.99	0.320	-.0566364	.0184965
mod_car	.2134755	.1033879	2.06	0.039	.0108389	.4161121
_cut1	-1.30801	.2647221	(Ancillary parameters)			
_cut2	-.0718165	.2582731				
_cut3	1.328586	.2634167				
_cut4	2.416441	.2766609				

Summary of Models 1C to 5C

Variable	BKK_C	JKT_C	KUL_C	MNL_C	ALL_C
info_c	.19270697*	.25324285	.15004996	.05374917	.14325365**
eff_c	-.02729595	.61108886***	.76505085***	.44030377***	.25589663***
adv_c	-.01980668	.08291536	.24689589*	.36938124**	.19240889**
snorm_c	1.2169514***	1.0047246***	.59517472***	.45629604***	.74714566***
fppp_mob	.3836001**	.07835549	.13790012	.04837067	.09240393
fppp_env	.27869871*	-.20015068	.20202005*	.12165051	.08251098
faimcar	-.14563301	-.0555471	-.31561528**	-.06489775	-.04263663
fatr_slf	.19901365**	.02578169	-.29868996*	.18111984	.11109097*
sex	-.45405942*	-.69992957*	-.02447176	.27305472	-.17283332
educ01	-.2893521	.03879455	.38701081	.03038982	.04596752
age	-.03938547***	.03132726	-.02576152	.00699779	-.00157437
inc	.03805592	.04028832	.13852933	-.02103767	
nhh	-.05153244	.04428032	-.05082624	-.02975502	-.01906999
mod_car	.38798089	.13494148	-.20906127	.09311062	.21347546*

legend: * p<0.05; ** p<0.01; *** p<0.001

Correlations among Independent Variables

Bangkok

	Variable no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	INFO_A																										
2	EFF_A	0.28																									
3	ADV_A																										
4	SNORM_A			**0.80**																							
5	INFO_B																										
6	EFF_B																										
7	ADV_B																										
8	SNORM_B							**0.86**																			
9	INFO_C																										
10	EFF_C									0.20																	
11	ADV_C									0.41																	
12	SNORM_C									0.33		**0.73**															
13	SEX																										
14	EDUC01		-0.15	-0.38	-0.35		-0.18	-0.29	-0.16	-0.24			-0.16														
15	AGE			0.17				0.24	0.28		-0.16	0.20	0.30	-0.14	-0.17												
16	NHH							-0.26	-0.27			-0.28	-0.30			-0.14											
17	CAROWN	-0.28		-0.28	-0.20	-0.20		-0.19	-0.25	-0.24			-0.19		0.17	-0.16											
18	DEST																										
19	INC		0.17	-0.23				-0.41	-0.41			-0.14	-0.16	-0.16	0.27		0.30		-0.17								
20	MOD_CAR			0.19	0.20	-0.14							0.19			0.18	0.23	0.32		0.27							
21	FPPS_ENV	0.32									-0.19		-0.15			-0.15				-0.21	-0.16						
22	FPPS_MOB			0.21	0.15	-0.20			0.19		0.17					0.23				0.24	0.32	-0.20					
23	FPPP_ENV	0.31				0.19					-0.16	-0.14	-0.24									**0.75**					
24	FPPP_MOB	0.24		0.21												0.18	0.15			0.18	0.31		**0.56**	0.17			
25	FATR_SLF	0.14	0.22				0.15								0.15			0.19		0.25	0.17		0.21				
26	FAIMCAR																0.14	0.24			0.45		0.22		0.17	0.31	

Only correlations significant at p<.050 are shown. Boldfaced figures are correlations >.50

Jakarta

	Variable no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	INFO_A																										
2	EFF_A																										
3	ADV_A		0.49																								
4	SNORM_A		**0.53**	**0.52**																							
5	INFO_B																										
6	EFF_B																										
7	ADV_B						0.41																				
8	SNORM_B						**0.50**	**0.66**																			
9	INFO_C																										
10	EFF_C																										
11	ADV_C										**0.58**																
12	SNORM_C										**0.63**	**0.67**															
13	SEX										-0.2					1											
14	EDUC01			-0.25	-0.20																						
15	AGE	0.19		0.21		0.23								0.21													
16	NHH			-0.2				-0.29	-0.35																		
17	CAROWN																										
18	DEST						-0.2	-0.2	-0.2	-0.3				-0.2		-0.3											
19	INC															0.26											
20	MOD_CAR			-0.19							-0.2							0.32									
21	FPPS_ENV																										
22	FPPS_MOB																										
23	FPPP_ENV																					0.41	0.32				
24	FPPP_MOB																					0.19	**0.50**				
25	FATR_SLF				0.26											0.2						0.24	0.18	0.26			
26	FAIMCAR			-0.3	-0.2									-0.2									0.26		0.27		

Only correlations significant at p<.050 are shown. Boldfaced figures are correlations >.50

Kuala Lumpur

	Variable no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	INFO_A																										
2	EFF_A	0.32																									
3	ADV_A	0.16	0.49																								
4	SNORM_A	0.26	**0.53**	**0.72**																							
5	INFO_B																										
6	EFF_B					**0.60**																					
7	ADV_B					0.38	0.46																				
8	SNORM_B					0.47	**0.65**	**0.66**																			
9	INFO_C																										
10	EFF_C									**0.50**																	
11	ADV_C									0.33	**0.53**																
12	SNORM_C									0.38	**0.50**	**0.66**															
13	SEX							-0.2																			
14	EDUC01			0.22	0.22			0.20																			
15	AGE			-0.16											-0.19												
16	NHH													-0.2													
17	CAROWN			-0.19								-0.2				0.27											
18	DEST										0.2					0.17											
19	INC		0.21								0.21				0.22	0.42	0.36	0.23									
20	MOD_CAR			-0.18								-0.2		0.19		0.26		0.65		0.18							
21	FPPS_ENV			0.24				0.2				0.22				-0.17		-0.2			-0.20						
22	FPPS_MOB					0.16				0.23									0.18	0.17							
23	FPPP_ENV			0.34	0.23			0.16				0.16		-0.2		-0.2		-0.3		-0.2	-0.2	**0.74**					
24	FPPP_MOB													0.21				0.17			0.17		0.30	-0.16			
25	FATR_SLF				0.18	0.16									0.26							0.17		0.19			
26	FAIMCAR			-0.2														0.20							0.29	-0.22	

Only correlations significant at p<.050 are shown. Boldfaced figures are correlations >.50

Manila

Variable no		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	INFO_A																										
2	EFF_A	0.20																									
3	ADV_A	0.17	0.4																								
4	SNORM_A	0.27	0.49	**0.66**																							
5	INFO_B																										
6	EFF_B					0.28																					
7	ADV_B					0.23	0.45																				
8	SNORM_B					0.35	0.48	**0.70**																			
9	INFO_C																										
10	EFF_C									0.31																	
11	ADV_C									0.37	0.39																
12	SNORM_C									0.32	0.44	**0.76**															
13	SEX										0.18																
14	EDUC01																										
15	AGE					-0.1				-0.1																	
16	NHH																										
17	CAROWN																										
18	DEST															0.47											
19	INC						0.23									0.14	0.18										
20	MOD_CAR		-0.1	-0.19	-0.14				-0.2					0.17		0.22		0.37	0.17								
21	FPPS_ENV			0.19	0.15													-0.1			-0.15						
22	FPPS_MOB						0.22		0.20											0.25							
23	FPPP_ENV			0.18			-0.2							-0.2				-0.2			-0.3	**0.52**					
24	FPPP_MOB	0.13		-0.16			0.17							0.14	0.18			0.16		0.16	0.20	-0.2	0.48	-0.24			
25	FATR_SLF						0.14										-0.1										
26	FAIMCAR			-0.2																0.27	0.19		0.17		0.36		

Only correlations significant at p<.050 are shown. Boldfaced figures are correlations >.50

All

Variable no		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	1	19	20	21	22	23	24	25
1	INFO_A																									
2	EFF_A	0.23																								
3	ADV_A		0.3																							
4	SNORM_A	0.21	0.38	**0.71**																						
5	INFO_B																									
6	EFF_B					0.35																				
7	ADV_B					0.28	0.37																			
8	SNORM_B					0.33	0.42	**0.77**																		
9	INFO_C																									
10	EFF_C									0.29																
11	ADV_C									0.34	0.37															
12	SNORM_C									0.29	0.33	**0.71**														
13	SEX																									
14	EDUC01			-0.08						-0.10																
15	AGE					-0.1									-0.10											
16	NHH					0.17							-0.13			-0.08										
17	CAROWN			-0.14	-0.11			-0.12	-0.13	-0.11		-0.1	-0.13													
18	DEST						-0.1																			
19	MOD_CAR							-0.11						0.08		0.17		0.38								
20	FPPS_ENV			0.09						-0.1	-0.1				0.1			-0.09		-0.16						
21	FPPS_MOB	0.09																		0.11						
22	FPPP_ENV			0.08			-0.1			-0.1	-0.10		-0.1	-0.1	0.14			-0.1		-0.19	**0.69**	0.10				
23	FPPP_MOB	0.12												0.13				0.09		0.17		0.48				
24	FATR_SLF		0.12		0.08		0.09								0.13						0.17	0.12	0.18			
25	FAIMCAR	0.09		-0.2	-0.1					0.1								0.09	-0.1	0.23		0.14	-0.14	0.19		

Only correlations significant at p<.050 are shown. Boldfaced figures are correlations >.50

Estimation Results for SEMs of Acceptability toward Package B and C

Regression results	**Param.**	**Std. Error**	**T**	**Prob.**
[MOD_CAR]-1->[FAIMCAR]	0.461	0.080	5.770	0.000
[INC]-2->[FINT_B_R]	-0.073	0.019	-3.783	0.000
[INC]-3->[FAIMCAR]	0.060	0.020	3.045	0.002
[SNORM_B]-4->[FINT_B_R]	0.193	0.032	6.019	0.000
[SNORM_B]-5->[ADV_B]	0.705	0.027	26.083	0.000
[SNORM_B]-6->[EFF_B]	0.415	0.035	12.010	0.000
[SNORM_B]-7->[ACC_B]	0.227	0.040	5.674	0.000
[FINT_B_R]-8->[FAIMCAR]	-0.063	0.038	-1.670	0.095
[FINT_B_R]-9->[EFF_B]	0.085	0.040	2.120	0.034
[FINT_B_R]-10->[ADV_B]	0.149	0.029	5.196	0.000
[FAIMCAR]-11->[ADV_B]	-0.025	0.028	-0.914	0.361
[EFF_B]-12->[ADV_B]	0.053	0.027	1.940	0.052
[EFF_B]-13->[ACC_B]	0.397	0.029	13.903	0.000
[ADV_B]-14->[ACC_B]	0.236	0.039	5.995	0.000
[INFO_B]-15->[ACC_B]	0.104	0.020	5.073	0.000
Basic summary statistics	**Value**			
Discrepancy Function	0.305			
Maximum Residual Cosine	0.000			
Maximum Absolute Gradient	0.000			
ICSF Criterion	0.000			
ICS Criterion	0.000			
ML Chi-Square	204.996			
Degrees of Freedom	21.000			
p-level	0.000			
RMS Standardized Residual	0.118			
Non-centrality Fit Indices	**Lower 90%**	**Point**	**Upper 90%**	
Population Noncentrality Para.	0.222	0.286	0.361	
Steiger-Lind RMSEA Index	0.103	0.117	0.131	
McDonald Noncentrality Index	0.835	0.867	0.895	
Population Gamma Index	0.926	0.940	0.953	
Adjusted Population Gamma Idx	0.841	0.872	0.899	
Single Sample Fit Indices	**Value**			
Joreskog GFI	0.934			
Joreskog AGFI	0.859			
Akaike Information Criterion	0.376			
Schwarz's Bayesian Criterion	0.538			
Browne-Cudeck CVI	0.378			
Independence Model Chi-Sqr	1649.3			
Independence Model df	36.000			
Bentler-Bonett NFI	0.876			
Bentler-Bonett Non-NFI	0.804			
Bentler Comparative F.I.	0.886			
Parsimonious F.I.	0.511			
Bollen's Rho	0.787			
Bollen's Delta	0.887			

Regression results	**Param.**	**Std. Error**	**T**	**Prob.**
[MOD_CAR]-1->[FAIMCAR]	0.457	0.079	5.781	0.000
[INC]-2->[FINT_C_R]	-0.031	0.020	-1.544	0.123
[INC]-3->[FAIMCAR]	0.063	0.019	3.288	0.001
[SNORM_C]-4->[FINT_C_R]	-0.050	0.034	-1.488	0.137
[SNORM_C]-5->[ADV_C]	0.657	0.028	23.643	0.000
[SNORM_C]-6->[EFF_C]	0.365	0.039	9.414	0.000
[SNORM_C]-7->[ACC_C]	0.553	0.038	14.553	0.000
[FINT_C_R]-8->[FAIMCAR]	-0.087	0.037	-2.335	0.020
[FINT_C_R]-9->[EFF_C]	0.075	0.044	1.708	0.088
[FINT_C_R]-10->[ADV_C]	0.008	0.030	0.257	0.797
[FAIMCAR]-11->[ADV_C]	-0.008	0.030	-0.284	0.776
[EFF_C]-12->[ADV_C]	0.130	0.026	4.993	0.000
[EFF_C]-13->[ACC_C]	0.181	0.027	6.782	0.000
[ADV_C]-14->[ACC_C]	0.107	0.039	2.750	0.006
[INFO_C]-15->[ACC_C]	0.092	0.026	3.518	0.000
Basic summary statistics	**Value**			
Discrepancy Function	0.258			
Maximum Residual Cosine	0.000			
Maximum Absolute Gradient	0.000			
ICSF Criterion	0.000			
ICS Criterion	0.000			
ML Chi-Square	174.385			
Degrees of Freedom	21.000			
p-level	0.000			
RMS Standardized Residual	0.098			
Non-centrality Fit Indices	**Lower 90%**	**Point**	**Upper 90%**	
Population Noncentrality Para.	0.154	0.208	0.274	
Steiger-Lind RMSEA Index	0.086	0.100	0.114	
McDonald Noncentrality Index	0.872	0.901	0.926	
Population Gamma Index	0.943	0.956	0.967	
Adjusted Population Gamma Idx	0.877	0.905	0.929	
Single Sample Fit Indices	**Value**			
Joreskog GFI	0.949			
Joreskog AGFI	0.892			
Akaike Information Criterion	0.329			
Schwarz's Bayesian Criterion	0.490			
Browne-Cudeck CVI	0.331			
Independence Model Chi-Sqr	1361.7			
Independence Model df	36.000			
Bentler-Bonett NFI	0.872			
Bentler-Bonett Non-NFI	0.802			
Bentler Comparative F.I.	0.884			
Parsimonious F.I.	0.509			
Bollen's Rho	0.780			
Bollen's Delta	0.886			

Biography

Berlian Kushari was born in June 30, 1978 in Purwokerto, Certral Java, Indonesia. He earned his bachelor degree in civil engineering from Gadjah Mada University in February 2001. After that, he became a faculty member at the University of Islam Indonesia. His fields of interest include transportation engineering, transportation demand modeling and transportation planning. In June 2003, he received a scholarship from the AUN/SEED-Net to continue his study at Graduate School of Engineering, Faculty of Engineering, Chulalongkorn University. He received his M.Eng. in transportation engineering from Chulalongkorn University in April 2005.