The application of social marketing in promoting sustainable transportation

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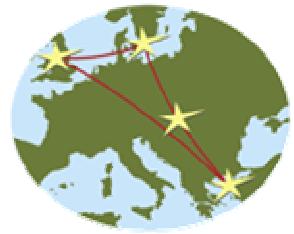
MESPOM

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Abstract

The traditional approach of dealing with transportation issues appears to be insufficient in bringing about sustainable urban traffic, as it does not take into account complex psychological processes assisting people in making their travel choices. New approaches are required to raise the effectiveness of transportation policies, by facilitating higher levels of public acceptance and engagement in promoted activities.

The current thesis aims to assist policy-makers and program-designers in making transportation systems more sustainable by employing a social marketing approach. It provides an in-depth understanding of what social marketing is, demonstrates its advantages over the traditional transportation planning process, and explores its successful application in Lund and Malmo, located in the south of Sweden – two of the leading European cities in sustainable transportation systems.

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Executive Summary

According to statistics provided in a report on GHG reduction strategies (OECD/ITF 2008), the world still faces the problem of increasing CO_2 emissions from road transport, mainly due to extensive individual car use. This is strong evidence that current policy practices in the transportation sector are not effective enough, as people still prefer driving their private vehicles, rather than shifting towards more sustainable alternatives. A sound transportation policy is required not only to combat climate change, but also to deal with the problems associated with extensive car use, such as congestion, noise, disruptive land use and accidents (Joyce 2008).

Most existing policies include different measures, such as technical solutions, economic instruments, legislation and informative tools, which can all be described as an attempt to solve environmental problems without addressing the main one, which is inadequate human behavior. Even though these measures aim to address unsustainable consumption patterns by altering the behavior of people in a desired manner, they do not take into account the complex psychological processes that lie behind the travel choices of people. At the same time, recent research in socio-psychological science has revealed that the actions of human beings are highly dependent on their attitudes (Gupta and Ogden 2006, Kollmuss and Agyeman 2002), and that considering these is highly important for the success of environmental policies (Nilsson and Kuller 2000).

Social marketing represents a new approach for dealing with transportation issues. It can be defined as "*a program planning process that promotes the voluntary behavior of target audiences by offering benefits they want, reducing barriers they are concerned about, and using persuasion to motivate their participation in program activity*" (Kotler and Roberto 1989). Social marketing contains key elements that are lacking in traditional policy planning: customer orientation, mutually beneficial exchange, relationship thinking and utilization of behavior change tools. These elements appeared to be crucial for program success, as they account for the behavior change factors assisting people in making their travel choices. These factors are responsible for change at the individual level (individual values and beliefs, perceived behavioral control and social norms), interpersonal level (appropriate information, effective reminders, possibilities to act environmentally, incentives to behave environmentally) and network level (qualities of environmental behavior, peer networks, different user segments).

With the purpose of investigating the advantages and practices of the application of social marketing in promoting environmentally sound transportation policies, case studies of the cities of Lund and Malmo, located in southern Sweden, were chosen for analysis, as they are well-known for their successful efforts in creating sustainable urban traffic. Particular focus was placed on promotion of sustainable travel options, such as cycling, bus ridership and car sharing. The following essential elements, innovative to the rational model conventionally applied in urban transportation planning, were revealed: problem definition within strong orientation on customer preferences, differentiation between the needs of target audiences, identification of benefits and barriers for customers, formulation of several exchange options (sustainable travel alternatives), provision of test offers, utilization of behaviour change tools, stakeholder involvement and piloting before wide scale policy implementation. Incorporation of these innovative steps contributes to the success of transportation policies through accounting for complex psychological process assisting people in making their travel choices, provision of several alternatives to problem solving with regard to different user groups, and facilitation of voluntary behaviour change. It also contributes to success through provision of comparative advantages of new behaviour that enables people to be voluntarily interested in behaviour change, risk and uncertainty mitigation associated with new behaviour, high level of

synergy through stakeholder involvement, careful consideration of behaviour response through piloting and going beyond traditional promotion activities. As a result, transportation policies appear to be more effective, with high levels of public acceptance and engagement in promoted activities.

While social marketing represents a much more holistic, flexible and iterative process of transportation policy planning compared to the traditional one, it complements the utilization of traditional policy tools, including technical, economic, regulatory and informative measures, with a new perspective of strong customer orientation at all stages of decision making. While it appears to be a successful approach for dealing with transportation issues in Lund and Malmo, it still requires substantial investment of time and money, constant adaptation to the area-specific context and further theoretical development.

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1 Introduction

1.1 Background

Nowadays one of the most important environmental challenges is to combat the climate change problem. The Kyoto Agreement has confirmed the necessity to cut the emissions of greenhouse gases by 8% in all sectors of economy by 2008-2012 compared to the 1990 level (European Union's portal 2009). At the same time, the transport sector contributes substantially to the greenhouse gas emissions, "representing 23% (worldwide) and 30% (OECD) of CO2 emissions from fossil fuel combustion in 2005", where the principal source is automobile transport (OECD/ITF 2008). In the European Union for instance only the "passenger cars account for about half the transport-related CO2 emissions" (European Union's portal 2009). Thus any actions undertaken to diminish CO2 emissions has to involve policy measures to curb transport-related emissions. A sound transportation policy is required not only to combat climate change, but also to deal with such problems associated with extensive car use as congestion, noise, disruptive land use and accidents (Joyce 2008).

Currently four principal types of environmental policy tools exist in transportation sector: economic instruments (fuel taxation, road pricing, congestion charging etc), technological measures aiming to affect quality and convenience of transportation systems (fuel-efficient cars, infrastructure improvement), regulatory measures (parking restrictions, car free zones, land-use planning, legislation on fuel quality and efficiency) and informative tools (Joyce 2008). However, all of them to the certain extent fail in their effectiveness to bring about desired changes as the GHG emissions from transportation sector continue to grow (OECD/ITF 2008). The great challenge in modern society is thus to find a way to increase the effectiveness of existing public policy planning process which is "limited without some additional tools and understanding of how to engage citizens in cooperative behavioral change" (Australian Public Service Commission 2007a). The necessity to involve new practices in order to attain 'sustained behavior change' is already recognized by many organizations dealing with policy planning issues (Anable *et. al.* 2006, Joyce 2008, Nilsson and Kuller 200).

Social marketing represents a new approach of dealing with transportation issues. It can be defined as "*a program planning process that promotes the voluntary behavior of target audiences by offering benefits they want, reducing barriers they are concerned about, and using persuasion to motivate their participation in program activity*" (Kotler and Roberto 1989). Current thesis aims to explore the benefits of social marketing in promotion of sustainable transportation policies. It might be of interest for policy makers and program designers in governmental and non-governmental sectors. The consumer orientation, which is the principal marketing concept and consideration of psychological process assisting people in making their choices, allows overcoming the main barrier in delivering desired policy outcomes which is low public acceptance and engagement. People are still unmotivated to make changes towards more sustainable transportation options. Besides increasing effectiveness of public policies, incorporation of social marketing approach in public policy planning process offers a variety of advantages compared to conventional policy measures:

Cost-effectiveness compared to other tools. The social marketing approach allows altering the behavior of people that are "prone, resistant or unable to behave" in the desired manner with much higher cost-effectiveness than traditional approaches do (Rothschild 1999), which are often connected to substantial investments in infrastructure improvement, development of fuel-efficient cars, subsidizing public transportation etc. According to the studies in transportation

demand management (TDM), marketing campaigns resulted in the short financial payback period, "indicating an excellent return on investment", including additional public benefits (Victoria Transport Policy Institute 2008).

Long-term stable results. In addition to cost-effectiveness, incorporation of social marketing approach leads to attainment of long-term and stable policy outcomes through provision of measures that reinforce desired behavior, such as relationship thinking, behavior change tools and formulation of attractive for customers exchange options. Permanent orientation on consumer's needs and wants contribute to constant adjusting of program to the changing market environment which raise its success (Andreasen 1995, McKenzie-Mohr 1999, Hastings 2003a). Moreover, managing the extensive car use from the very route of the problem which is travel behavior, social marketing allows predicting and avoiding the so-called generated traffic effects (Litman and Doherty 2009) when due to certain improvements the latent demand fills the new road capacity bringing to zero the attempts of creating sustainable city traffic.

Respect to demographic liberties and equity issue. Compared to the regulatory measures, social marketing approach respects the democratic liberties, mainly free choice of individuals, offering "a mechanism to find a cooperative balance between the rights of the individual and the rights of society" (Rothschild 1999). Also, it appeared to be progressive in respect to income tending "to benefit lower-income and transportation disadvantaged people by improving their mobility options, increasing access for non-drivers, and reducing the stigma often associated with alternative modes" (Victoria Transport Policy Institute 2008).

1.2 Problem statement: attitudinal behaviour gap in traditional policy planning

In the beginning of 1970s it was already recognized that environmental problems stem out from the maladaptive behavior of human beings and facilitation of pro-environmental behavior is required to deal with ecological crisis in different spheres of human's life (Stern and Oskamp1987). However, most policies that are currently in place aim at focusing on different measures such as technical solutions, economic instruments, legislation and informative tools. These tools attempt to solve the environmental problems by means that do not address the main problem which is inadequate human behavior. Even though these measures have a goal to address the unsustainable consumption patterns trialing to alter the behavior of people in the desired manner, they do not take into account the complex psychological processes assisting people in making certain choices. At the same time recent research in socio-psychological science has revealed that actions of human beings are highly dependent on their attitudes (Gupta and Ogden 2006, Kollmuss and Agyeman 2002) and their consideration is highly important for success of the environmental policies (Nilsson and Kuller 2000). The great challenge in the contemporary public policy process is thus to find a new approach, which will be able to close the existing attitudinal-behavior gap in current practices of dealing with environmental issues (Gupta and Ogden 2006, Anable *et. al.* 2006, Australian Public Service Commission 2007b).

In regard to the environmentally sound transportation policies, the necessity to consider the attitudinal-behavior relationships in assisting travel choices is very important (Anable *et. al.* 2006, Nilsson and Kuller 2000). As has been revealed by Ory and Mokhtarian (2005), traveling is not only the derived demand caused by the necessity to reach different places to carry out the required activities, but is also a desired activity per se. People travel not only because they have to, but also because they like driving as it brings them feeling of fun, independence, image, control over situation etc. Such positive utilities of traveling creates the

necessity to address the individual characteristics of people from the deeper psychological perspective besides of the most often undertaken measures such as influencing price, quality and convenience of the transportation system, improving land-use mix and provision of factual information (Joyce 2008). The intrusion of pro-environmental behavior framework in dealing with transportation issues is required where greater effort has to be put in addressing the individual needs and wants with further accommodating these personal attributes in the public policy planning process (DEFRA 2008). This will help to develop a policy that will motivate people to be engaged in the behavior change, which will raise the effectiveness of the policy outcomes.

Thus, the problem statement formulation can be briefly summarized as following:

Despite the importance of addressing the attitudinal-behavior gap, traditional policy planning in transportation field fails to account for the complex psychological process assisting people in making their choices. People still appeared to be passive as they lack the motivation to change their behavior which results in policy ineffectiveness. New approaches are required to bring about social behavior change in an effective way.

1.3 Objective and Research Question

The main aim of this study is to assist policy-makers in making transportation systems more sustainable by employing social marketing approach. The following objectives are set to achieve this aim:

- to identify key elements of social marketing that make it advantageous compared to the traditional policy tools

- to determine how the program planning should look like within the context of social marketing approach.

- to investigate contribution of social marketing to success rate of transportation policies

Current thesis aims to answer the following research questions:

Research question №1. Why social marketing is advantageous compared to traditional policy planning in dealing with transportation issues?

> Subquestion 1. What elements of social marketing makes it advantageous compared to traditional policy planning?

> Subquestion 2. How might social marketing approach help closing the attitudinal-behavior gap in transportation policies?

Research question №2. How can social marketing approach contribute to improving success of existing policy packages dealing with transportation issues?

1.4 Scope and limitations of thesis

The scope of current paper lies within geographic boundaries of southern Sweden, region of Skane. Investigation on contribution of social marketing approach to transportation policy-making is based on the overview of case studies of Lund and Malmo, two of the most foremost European cities in their measures of creating sustainable city traffic.

Application of social marketing in conducting transportation policies is limited to promotion of cycling, bus ridership and car sharing that are the main travel alternatives offered for citizens in Lund and Malmo.

During literature review, the theory of social marketing was investigated on the general level with examples from different areas of expertise, not necessarily from transportation field. It happens due to the fact that social marketing is recently emerged approach and it has been mainly used for the promotion of health management programs.

It should be noticed, that in regard to observed literature sources one of research constraints was connected to availability of transportation evaluation reports for Lund and Malmo only in Swedish language, what posed certain difficulties for collecting of necessary data about effects of social marketing campaigns on the travel behavior change. Moreover, the most recent evaluation study on effects of traffic measures in Lund is still at elaboration stage by TRIVECTOR consultancy and access to it was limited as to unpublished material.

In regard to personal communications conducted, one of constraints was not accessibility of measure leaders responsible for promotion of car sharing in Malmo and bus ridership both in Lund and Malmo, though evaluation reports on associated activities were sent by them via e-mail according to request. Interviewing of civil servants at the Mobility Offices both in Lund and Malmo further allows mitigating this research limitation by getting required information for description and analysis of case studies.

1.5 Methodology

With the purpose to investigate the advantages and practices of social marketing application in promoting environmentally sound transportation policies, three main methods of qualitative research were considered by the author as the most suitable for obtaining relevant and sufficient information to answer the research questions: literature review, case studies and personal communication (Figure 1-1). The combination of different approaches in data collection allows getting complementary, deeper and integrated insight on the investigated problem.
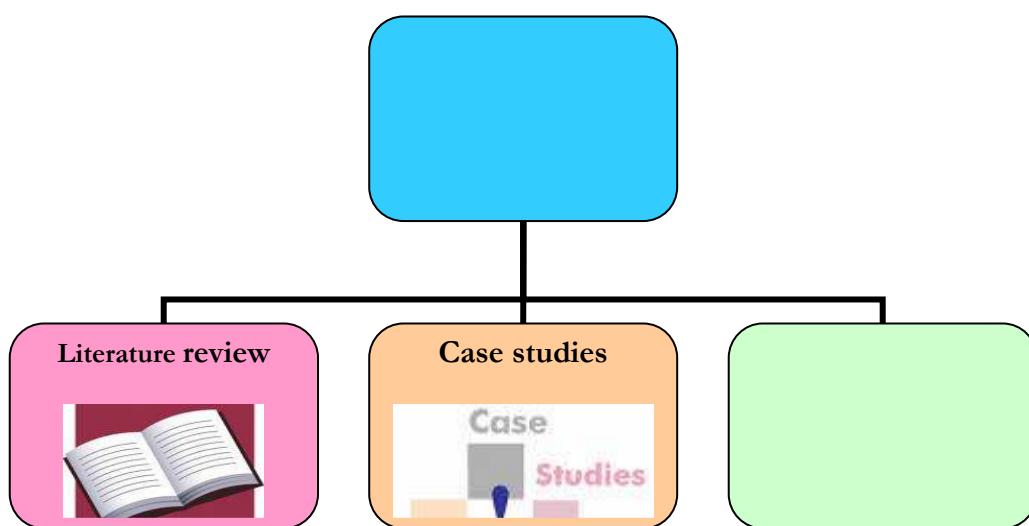
Figure 1-1 applied research methods

1.5.1 Literature review

Literature review of academic and policy papers, reports, journal articles, media news and web-documents was conducted and helped obtain general understanding of the social marketing concept and advantages it offers compared to traditional policy planning process. In addition, explanatory theory on behavior change was touched upon in order to improve understanding of psychological factors that affect people's actions. Then social marketing approach was analyzed with specific focus on how in contributes to closing the attitudinal-behavior gap existing in the current transportation policy practices.

As a result of literature review as the first step of the research, the inherent features of social marketing that make it advantageous compared to traditional approaches were revealed and the analytical framework was defined for carrying out further analysis of case studies. Analytical framework is based on the model of community-based social marketing developed by Mc-Kenzie Mohr (1999), but was complemented with elements revealed by author during examination of the aforementioned literature sources.

1.5.2 Case studies

Two case studies were chosen for investigating the implementation of social marketing approach in managing sustainable transportation issues. Lund and Malmo cities were considered, both located in southern Sweden, as they recently have started active initiatives in promoting sustainable transportation options among citizens, in which focus is on accommodation of personal needs and wants as determinants of travel behavior. Lund city has taken course on the creation of environmentally adapted transport system LundaMats (stands for Swedish Miljö Anpassade Transport System) since 1998. Malmo became member to the European Union CIVITAS project (stands for City, Vitality, Sustainability) in 2005 aiming to establish cleaner and better transportation in urban areas. Both strategies incorporate the social marketing measures to create "an intelligent, sustainable and intermodal city traffic" and became successful in making the life of urban dwellers convenient without extensive use of private vehicles. (CIVITAS 2009).

The case studies were analyzed on the basis of analytical framework defined during the process of literature review. Such analysis allows investigating undertaken in Lund and Malmo social marketing transportation campaigns in a systematic way, revealing the important elements that make it successful, as well as weak points that need to be consequently strengthened. Based on the outcomes of the case-studies analysis it became possible to identify the social marketing measures in transportation policies that raise its effectiveness and at the same time to elaborate on recommendations for further improvements.

The experiences of Lund and Malmo were chosen for analysis as they have currently achieved successful results in the field of sustainable transportation management and can serve as demonstration examples for other cities. At the same time investigation of several cases makes it possible to conduct comparative analysis of undertaken measures to obtain a more comprehensive picture of how social marketing measures are applied in practice and how they raise success rate of existing transportation policy packages.

1.5.3 Personal Communication

Semi-structured interviews were conducted with six respondents, who are the leaders of marketing campaigns dedicated to promoting sustainable travel alternatives, civil servants from Mobility Offices, stuff from TRIVECTOR consultancy responsible for evaluation of effectiveness of traffic measures and the car sharing company in Lund. The interview questionnaires are presented in Appendix I.

Personal communication provides complementary and supportive information for case studies including specific and verified information on the set of measures undertaken by municipalities in order to elaborate on the environmentally friendly city traffic.

1.7 Outline of the thesis

This research is structured as follows:

Chapter 1 defines problem area and poses research questions, as well as explains and justifies chosen methodology.

Chapter 2 overviews the deficits of traditional policy planning process and employed tools in dealing with transportation issues, further elaborating on research gaps and identifying the research questions

Chapter 3 provides an overview of the most commonly recognized and influential psychological studies that account for behavior change factors and suggests its application for faciliatation of travel beahaviour change.

Chapter 4 aims to identify the key elements of social marketing that take into consideration behavior change factors, thus helping to close the attitudinal-behavior gap existing in traditional policy planning. It also elaborates on how the policy planning process should look like within the context of social marketing approach.

Chapter 5 investigates the application of the social marketing approach in sustainable transportation planning in Lund and Malmo, with particular focus on cycling, public transportation and car sharing.

Chapter 6 analyses the contribution of social marketing to traditional process of transportation planning based on the investigated cases of Lund and Malmo where the new approach has been recently implemented.

Chapter 7 discusses strong and weak points of social marketing approach in transportation policy planning, which might be of value for consideration in case of its application. Also, discussion of the employed in the current study research methods that might affect the results of the study is presented.

Chapter 8 summarizes the main findings of the study, elaborates on recommendations for further improvements and suggests areas for future research.

2 Deficits of traditional approaches in dealing with transportation issues

2.1 Traditional policy planning process in transportation sector

According to the statistics provided in Report on GHG reduction strategies (OECD/ITF 2008), the world still continues to face the problem of increasing CO_2 emissions from the road transport mainly due to extensive passenger car use. This is the strong evidence that current policy practices in the transportation sector are not effective enough as people still continue driving their private vehicles than shifting towards more sustainable alternatives.

The reason is that urban transportation planning still continues to base on the rational planning model which though often results in failure of the set objectives or "at best, inconsistent results" (Goetz and Szyliowicz 1997). This model is goal-oriented, assuming there is one best solution to the whole problem; technology transfer is believed to control the environmental issues and required changes can be performed from the top by experts, who assumed to possess objectivity of scientific knowledge (Freie Universitat Berlin 2007). Though this model received a lot of criticism it still continues to be "taught by accredited planning programs" (Pickens 2002) and involves the following steps to make logically sound decisions (Figure 2-1):

1. *Verify, define and detail the problem.* Within this step the needs assessment is carried out leading to focus problem formulation. Objectives are identified and designed to address the defined problem and against them program success is monitored. The assumption is made that identified problems can be resolved by appropriate experts independently. "Experts bring their acumen to bear on society's problems. Problems are broken down into disciplines and then attacked by specialists who become professional technological fixers" (Patterson 1993).

2. *Estimate and evaluate criteria.* During this step, in order "to be rational and measurable" defined problems and objectives are formulated in "operational or quantitative terms" (Patterson 1993). According to these indicators, then the optimal performance is identified and the program success is measured.

3, 4, 5. *Identify/evaluate/ distinguish among alternatives.* According to the set objectives, alternative solutions are explored. After their formulation, these options are evaluated and compared on the basis of numerical indicators defined in the previous step. Such comparison allows coming up with the optimal solution in achieving the required performance.

6. *Monitor implemented solution.* Once the best option to the problem is displayed, it is "executed to solve the problem" (Patterson 1993). Thus improvements are made based on the monitoring of already implemented solution.
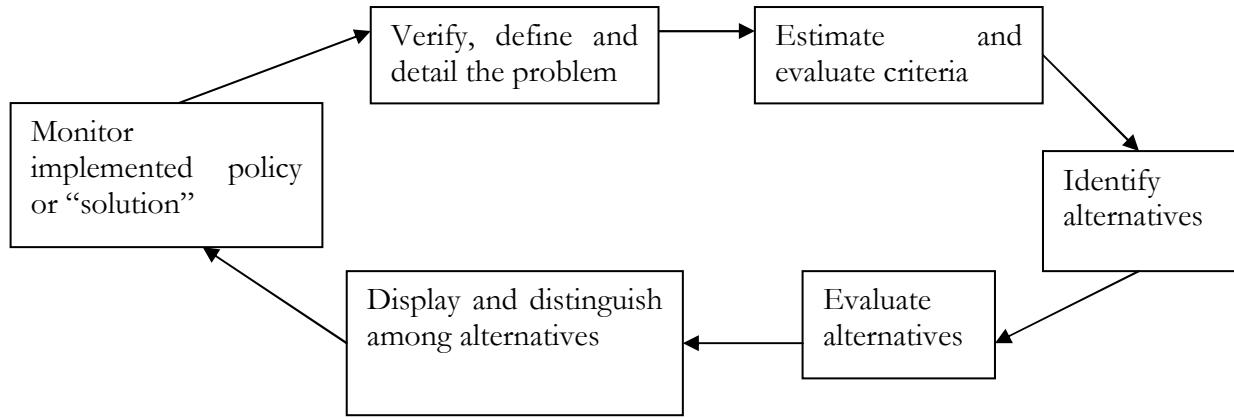
Figure 2-1 rational model of program planning

Source: Pickens 2002

As Patterson (1993) highlighted, such way of program planning appeared to be effective "in addressing well-defined issues and where desired outcomes are agreed on such as eradicating mastitis in dairy cows or ensuring food safety" while has failed in addressing the complex societal problems. These so-called 'wicked' problems' require the deeper socio-psychological insights where 'one size fits all' approach (one best way of problems solving) is no more relevant as different people have different views about the problem and desired outcomes.

Also, in rational model the population that is affected by planning is virtually not involved in the decision making (Freie Universitat Berlin 2007) which is performed by external experts. This results in non-accounting of local practices and concerns and finally public disengagement in the desired change. Though communicative rationality is also considered in implementation of transportation policies where constant dialogue with stakeholders is required to account for the local needs (Freie Universitat Berlin 2007), it is still limited on practice to the one-way communication as information provision (Ben-Akiva et al. 1998). Moreover, the rational planning of transportation issues by the external experts resulted in command-control principle rather than equity in power among participated stakeholders (Ben-Akiva et al. 1998).

In addition, once planned, the decision is implemented on a wide scale before pilot testing. This creates a discrepancy between planning process and real ground situation and might result in huge budget and time expenses without any guarantee of successful problem-solving. The incremental model in transportation planning recognizes the complexity of the real world situation and requires constant iterative process in program planning to adjust the policy to experience in reality (Freie Universitat Berlin 2007). Still, "the urban transportation planning models fail to capture the behavioral realism necessary to accurately reflect the impacts of transportation policy" (Ben-Akiva *et. al.* 1998).

To sum up, the main drawbacks in existing urban transportation planning process are:

- Focus on the one best alternative which does not provide people with the choices that better suit their own needs and concerns
- Reliance on external experts rather than stakeholder participation in the process of decision-making. If community involvement is considered, it is often limited to the information provision

- Inequity in power distribution among participated stakeholders (command–control principle).
- Non-consideration of the ground realities on how people behave in response to the elaborated measures (no piloting before implementation).

2.2 What are the problems with environmental policy tools utilized in transportation sector

Four main types of environmental policy tools are utilized to deal with the transportation issues: economic instruments, technological measures, regulations and informative tools. All of them are based on the instrumental or communicative, in case of informative tools, rationality approach (described in the previous section 2.1), which is looking for the most efficient and effective way of problem-solving while staying isolated from the public needs and concerns. It results in their inability to fully tackle the complex socio-environmental problems such as unsustainable transportation. The main reasons why these four main environmentally policy tools engaged in transportation planning are not able to fully tackle the transportation problems are summarized below.

Technological measures (fuel-efficient cars, infrastructure improvement). In the EU, technical measures such as fuel-efficient cars can contribute to 30 % decrease in CO_2 emissions, which is substantial but still not enough to curb all transport-related emissions. (European Union's portal 2009). Moreover, the constantly increasing amount of cars can finally lead to the loss of the positive effects associated with technological improvements and lead to accumulation of the negative ones (Joyce 2008). Furthermore, "electric cars and other alternative fuels reduce some external costs, particularly urban air pollution, noise… but do not affect others such as accident risk, congestion" (Litman and Doherty 2009) and disruptive land use.

Other technological measures are associated with increasing quality and convenience of transportation system which is very often related to infrastructure improvements. Unfortunately, funding tend to be allocated mainly to expanding road capacity for individual cars over other alternatives (Litman and Doherty 2009). Moreover, the capacity is often calculated on the basis of "how many trips would be made on an unpriced facility, then try to build a facility big enough to accommodate that number of trips" (Moore and Thorsnes 1994). This leads to the generated traffic effects where latent demand fills the new road capacity finally increasing congestion.

Economic instruments (fuel taxation, road pricing, congestion charging etc). Pricing measures are often appeared to be ineffective in dealing with transportation issues. This has been resulted due to the practice of underpricing where environmental and social impacts are not monetized in the final costs. "Even costs such as parking demand and public service demands of increased motor vehicle use are seldom considered in transportation planning and project evaluation" (Litman and Doherty 2009). As result the perceived benefits of driving tend to overweight the associated costs, people continue driving and congestion problem stay unsolved creating diseconomies in other areas. In the long run, underpricing contribute further to unsustainable transportation imposing certain land use and social practices that increase necessity of traveling creating inconveniences for transportation of disadvantaged people. Also, most pricing mechanisms are regressive in respect to income incurring more burdens on the low income class.

Regulatory measures (parking restrictions, car free zones, land-use planning, legislation on fuel quality and efficiency). Among the regulatory measures undertaken in the transportation policies the well-

known are parking restrictions, car free zones, traffic restraints etc which reduce driving and emissions in certain public area while the "effect on the total car use and travel appears to be small" (Joyce 2008) creating pollution and congestion in the neighborhoods. The more promising regulatory policies are those connected to land-use planning which can have substantial impact on decreasing car dependency (Joyce 2008).Though the importance of such measures are recognized, it still deserves limited attention of the public planners and the "missing link between transportation and land use planning" continue to exist (Litman and Doherty 2009).

Informative tools (education). Concerning informative tools, the focus is currently given to the provision of factual information. The assumption that possessiveness of environmental knowledge will lead to changes in environmental attitudes and consequently behavior stems from the linear US behavior change model which proved to be incorrect already in the early 1980s (Kollmuss and Agyeman 2002). In addition, the studies conducted in the field of sustainable transportation (Ampt 2003, Nilsson and Kuller 2000) has revealed that simple feed in of environmental knowledge has very little effect on changing travel behavior towards more environmentally friendly modes. More effort has to be put to address the characteristics of individuals, their personal needs and wants with further accommodation of these personal attributes in the public policy planning (Joyce 2008, Nilsson and Kuller 2000). As Swedish National Environmental Protection Agency and Swedish Transport and Communications Research Board has emphasized the greater focus should be put on the attitudinal variables and lifestyle characteristics of people in studying their choice of different transportation modes (Nilsson and Kuller 2000).

3 Factors affecting the pro-environmental behaviour of people

The "pro-environmental behavior" is the "behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g. minimize resource and energy consumption, use of non-toxic substances, reduce waste production)" (Kollmuss and Agyeman 2002). Obviously, careful consideration of conditions that favor or restrain pro-environmental behavior in the environmental policy planning will help to close the existing value-action gap thus facilitating the process of shifting society towards more sustainable lifestyles.

With the purpose to identify these factors it was decided to conduct the literature review of the theories of behavior change. The broad scope of existing literature in human psychology and no definite findings on what makes people to act in a certain manner demonstrate the complexity of the field. Current chapter provides an overview of the most commonly recognized and influential studies that try to explain what factors define the behavior of people and suggests its application to the pro-environmental behavior.

3.1 Discrepancy between environmental attitude and behavior

The simplest model of pro-environmental behavior is based on the linear dependency between environmental knowledge, attitude and behavior[1] (Figure 3-1). Such linear model has though proved to be wrong in 1970s and called a 'deficit' one. Recent research has revealed that sole reliance on education and raising awareness of people did not necessarily bring about desired pro-environmental behavior (Kollmuss and Agyeman 2002). Rajecki (1982) has named four main reasons that cause a decoupling between environmental attitudes and behavior. Firstly, the attitudinal-behavior correlation is weakened due to the conflict occurred between direct and indirect experience when those what people see in the real world situation is not supported by the information/education they receive (e. g. a lot of cars on the road versus education on the adverse effects of driving). Secondly, if social norms and cultural traditions tend to promote unsustainable lifestyle patterns, the probability of occurrence of the pro-environmental behavior is very low (e.g. the driving culture in USA). Thirdly, attitudes of people are changing over time, so if there is a temporal interval in studying attitudes and behavior, further discrepancy may occur (e.g. travel behavior is changing over time "as people change income, jobs, homes, abilities, responsibilities and preferences" (Victoria Transport Policy Institute 2008). Finally, sometimes the attitudes are measured with much more extensive scope than behavior, which also leads to inconsistent results (awareness about climate change issues and travel habits). As the recent research at the Department for Transport, UK has shown "there is only a weak link between knowledge and awareness of climate change on the one hand and travel behaviour at the individual level on the other" (Anable *et. al.* 2006).

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[1] According to Weigel (1983), attitude is "an enduring set of beliefs about an object that predisposes people to behave in particular way toward the object". The environmental attitude thus can be defined as environmental awareness and concern (Kollmus and Agyeman)
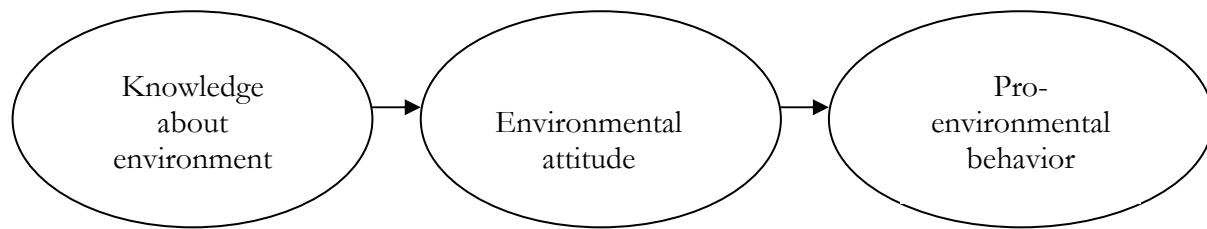
Figure 3-1 deficit model of pro-environmental behaviour

Source: Kollmuss and Agyeman 2002

3.2 Review of studies on explanatory theory of behaviour change

As it was noticed above the relationship between environmental attitudes and behavior is not linear and determined not only by possessiveness of environmental knowledge. There are a number of additional factors that affect the environmental attitudes which predispose certain actions. The deeper insight into the socio-psychological studies might help to close the 'attitudinal-behavior' gap and draw conclusions on the role of different factors in making people behave in the pro-environmental manner.

During literature search for a theory that tries to bind the 'value-action gap' it was found no unified well-defined explanatory model of the behavior change. In order to get more sufficient picture of the factors that affect the environmental behavior it was decided to review most commonly known and recognized models of behavior change from three different levels: intrapersonal, interpersonal and network (Table 3-1) (Bracht 1990, Anable *et. al.* 2006).

Table 3-1 Theories of behaviour change

Intrapersonal level (account for individual characteristics and motivation, and subjective norm – how others will perceive the behavior)	Interpersonal level (account for relationships with others: friends, families etc.)	Network level (account for organizational influences in community)
Theory of Reasoned and Planned Actions	Social Learning Theory	Diffusion of Innovations

3.2.1 Theory of Reasoned and Planned Actions

The intrapersonal-level theories consider that the main predictors of behavior are based on the individual perceptions and motivations of the person towards certain actions. The most commonly recognized theory in this field is the Theory of Reasoned and Planned actions elaborated by Ajzen and Fishbein (1980) and later updated by Ajzen in 1991. The main assumption made is that people mainly behave in the rational manner, i.e. their behavior is deliberative. According to the theory of reasoned and planned actions, the behavior is predisposed by the intention to act which is affected by the personal attitudes towards certain

behavior, normative beliefs (what other people from one's surrounding think about certain behavior) and perceived behavioral control (Figure 3-2). The perceived behavior control implies the belief in controllability over the situation where the person decides by him/herself when and how to act, and at the same time represents the individual's belief about whether his/her actions can finally significantly contribute to the desired change in the society.

According to the theory of reasoned and planned actions, the more auspicious attitudes and norms towards desired behavior and the stronger the locus of control, the higher the possibility of performing the behavior in question. This assumption provides important information for designing public policy strategy that better accounts for the individual concerns and values as well as focus on the promotion of social norms (making people to observe that others considered the new behavior as normal and indispensable).
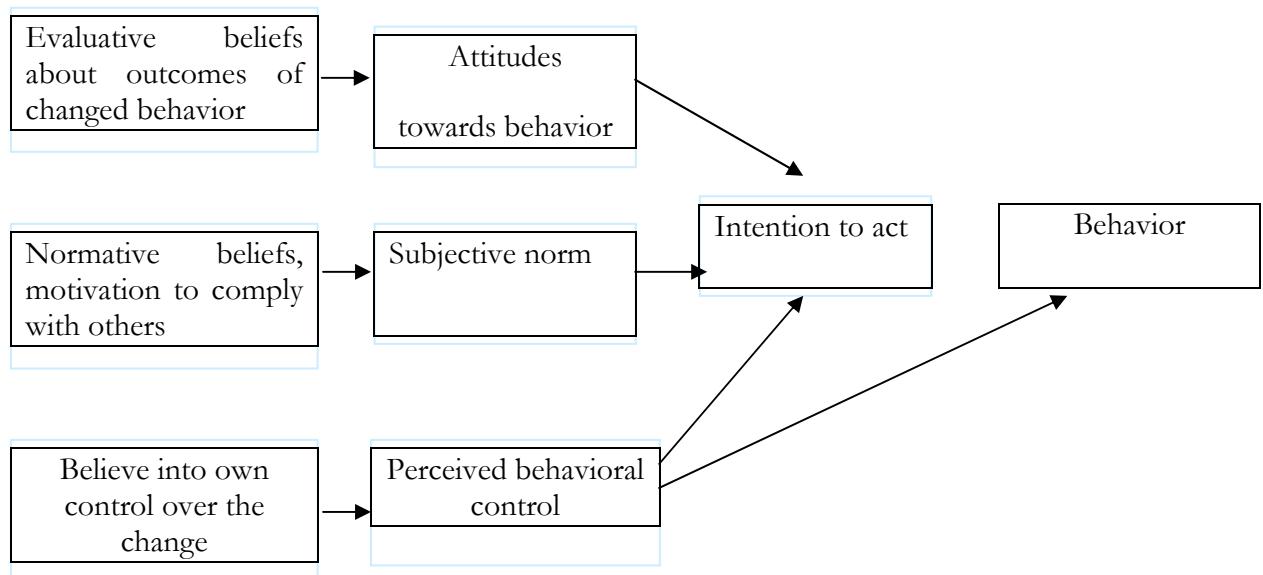
Figure 3-2 Theory of Reasoned and Planned Actions

Source: Ajzen and Fishbein 1980, Aizen 1991

3.2.2 Social Learning Theory

Intrapersonal theories account for the influence of person's relationships with friends, colleagues etc. on the behavior change (Bracht 1990). The Social Learning Theory is the most common and well known among the interpersonal theories and was proposed by Albert Bandura in 1977 (Bandura 1977). In contrast to the theory of reasoned and planned actions, this psychological model considers that behavior is shaped not only by the personal characteristics intrinsic to individuals, but also due to ability of people to learn through observing the actions of other people in their environment, also known as behavior modeling. The theory creates a bridge between behavioral, cognitive and environmental factors, which are believed to influence each other ('reciprocal determinism)' (Lefebvre 2000). Social learning theory includes four main processes that are considered to be core components for successful behavior modeling:

- Attention: attracting and maintaining the attention. The ability to gain attention depends on the number of factors such as distinctiveness, simplicity, affective valence of information etc

- Retention: remembering of what the attention is paid for. The ability of being remembered depends on the applied reminding techniques that create mental images to promote the change.
- Reproduction: reproducing the modeled behavior. The ability to imitate the behavior depends on whether a person possesses enough information and knows how to act, as well as on person's capability to fulfill the certain actions (physical abilities, supportive infrastructure).
- Motivation: having incentives to imitate the behavior. This last but not least element is responsible for making people interested to be engaged in the behavior change.

The interpersonal theory contributes to the theoretical understanding of the behavior change process through the idea of behavior modeling. Elaboration on the behavior modeling techniques based on the before mentioned core elements of the social learning theory might raise the effectiveness of the public policy promotion.

3.2.3 Diffusion of Innovations Theory

The theories of network level recognize that individuals themselves are not the only agents of change. The whole community system consists of a number of subsystems or organizations, and "changes in subsystems and their interrelationships can also influence the system" (Bracht 1990). It is true that societal organizations create their own values and norms, so they also have to be considered as important sources of change (Zey-Ferrell and Aiken 1981). If organization is altered in the way to support changes than it is more likely that people who are belonging to organization will also adopt these changes on the individual level following the organizational policy, even if it is contradictory to the social norms (Bracht 1990).

The process of learning and changing in organizations is happening in accordance with the process of diffusion (Rogers and Shoemaker 1971). Diffusion research investigates how the innovations are adopted in the population, which conditions favor and which, on the opposite, hamper the probability that new products and practices will be taken up by people. Diffusion of Innovations Theory (Rogers 1995) can be applied to promote the social change through treating new behavior as innovative product. It drastically differs from the other theories of change: "instead of focusing on persuading individuals to change, it sees change as being primarily about the evolution or 'reinvention' of products and behaviours so they become better fits for the needs of individuals and groups" (Robinson 2009).

The Diffusion of Innovations Theory offers three relevant insights to the behavior change theory (Robinson 2009): determine the qualities that increase the innovation success, recognize the importance of peer networks and differentiation between the needs of different user groups.

3.2.3.1 Qualities that increase innovation success

It was determined by the scholars that there are five main qualities that are responsible for 49% - 87% of success in innovation spread (Robinson 2009):

1) *Comparative advantage* of new ideas with regard to the conventional one. It is measured in terms that are appreciated by people like economic advantage, level of convenience, public prestige/image etc. depending on what people value the most in the given user group.

2) *Correspondence with existing organizational values and practices* is crucially important for the success of innovation. The higher consistency with societal context, the values and experience people share, the more likely the adoption of innovation is happening.

3) *Ease in understanding and use* implies that simple ideas are capable to be adopted faster than those that are required better understanding and new skills to develop.

4) *Trialability* of new idea allows testing it, which helps to overcome such barrier as uncertainty and risks associated with adoption of innovative practices.

5) *Visible results* let individuals to observe the privileges of the innovation lowering the level of uncertainties and initiating discussions with people from their environment what also contribute to the successful adoption of new ideas.

These five characteristics of innovation named above are important to address in order to increase the likelihood of adoption the new behaviors and can be used as a checklist for identifying the weak points of promoted behavior that prevents the social change from happening.

3.2.3.2 Importance of peer networks

Another insight of diffusion research into behavior change theory is the importance of peer-to-peer communication. According to Bass (1993) the impersonal methods of communication through mass media channels provide information for customers but what mainly makes the innovation to be adopted is peer-to-peer communication. As adoption of new behavior involves a lot of uncertainties and therefore risks, the assurance from the credible neighbors demonstrate that the change is worth making. Effectiveness of peer-to-peer communication leads to recognition of importance of peer networks (relationship thinking) where organizations themselves disseminate new practices through social networks.

3.2.3.3 Differentiation between different user groups

According to Diffusion Theory the population can be divided into five main groups depending on their propensity to take up new ideas (Robinson 2009):

- Innovators (account for 2,5 % of population): those who actually develop the new ideas, they are very idealistic and enthusiastic compared to pragmatic majority.
- Early adopters (account for 13,5% of population): those who can afford the quick adoption of innovation as they have time and money to invest. They are looking forward to the social and economic advantages over others and ready to take risks for it. Usually, the early adopters are respected players in the community as they are more economically successful and have well-elaborated networks, so in case of success the peers become also interested in making a change. Furthermore, early adopters are the first who test the innovation and help refine it to suit the majority needs.
- Early majority (account for 34% of population): the pragmatics that are quite liberal, influenced by the progressive ideas and fashion but very sensitive to cost issues and risks. They are acting only in case of assured benefits such as cheaper, easier, more convenient, and faster solutions etc.
- Late majority (account for 34% of population): they are pragmatics as the early adopters but at the same time very conservative to the new ideas. Actually the main driver that

makes them to adopt the innovation is the fear of not fitting in the existing standards. To convince them to make a change the emphasis should be put not only on the product's benefits but mainly on promoting the social norms. If they can observe that other conservatives perceive the new behavior as normal, they are more likely to make a change.

- Laggards (account for 16% of population): the most conservative segment of community who associate a lot of risks with the new product or behavior because it makes them to alter their life paradigms. Their attitudes towards the innovative ideas are the most tough to alter, and you have to focus on the social norms, to familiarize them more with the new ideas and grant them a high level of personal control, so they can decide by themselves when and how they can make a change.

The idea behind the division of users into five main segments is that each user group shares common attitudes towards innovation and one has to adjust it towards each segment to better meet their demands. Constant reinvention of new ideas is required to increase its successful adoption by the community members.

3.3 Summary of factors affecting the pro-environmental behaviour

The presented psychological theories allow making an assumption about the validity of identified factors affecting people's actions in regard to the pro-environmental behavior. The following factors are suggested to be important to address while promoting the pro-environmental behavior and have to be considered in the public policy planning process to close the 'value-action' gap.

1. Factors, responsible for the change on the individual level:

- *Individual values and beliefs* that should not be limited only to environmental values. These factors should have rather broader scope to identify the personal preferences of people due to their economic or social status, perceived barriers to the environmentally responsible behavior etc. With regard to sustainable transportation, people can value costs, comfort, speed, accessibility, health and these personal issues have to be accounted for the policy planning process
- *Perceived behavioral control* should be strong so that people are left to decide by themselves when and how they act to benefit the environment. In case of sustainable transportation policies, it is good when people are provided with a number of options (walking, cycling, public transportation, car sharing/pooling) so that they can peak up one according to their own considerations. It is also better when people believe that their actions will significantly contribute to the environmental improvements.
- *Social norms, i.e. cultural context* should favor the environmental behavior. People have to see that others from their surrounding consider the environmentally responsible behavior as normal and indispensable. As far as cultural traditions are promoting the unsustainable lifestyles the pro-environmental behavior has very low probability to happen.

2. Factors responsible for the change on the interpersonal level (families, friend's environment):

- *Appropriate information* has to be given to attract attention of people to the environmental problem. This information has to be consistent with the individual values and social norms so that people can see a valid point for them to pay attention to it. For instance, the information on climate change issues is too broad to make people to link it to their transportation patterns, they rather will be concerned with the health issues regarding air

pollution, noise etc. and what effects it has on them and their children (pers. comm. Anders Sodberg).

- *Effective reminders* have to be in place so that people are able to remember that they have to act in an environmentally responsible manner. For instance, vivid messages such as media stories, information sheets etc.
- *Possibility to behave environmentally* means that people know how to do it and have a supportive infrastructure in place to perform environmentally sustainable activities. In case of sustainable transportation, it means that without safe bicycle roots with good access to different destinations the promotion of cycling will fail. Also, if people do not know how to catch right busses to get to work, or how to arrange the car pooling, they will obviously continue to drive their private vehicles.
- *Incentives to behave environmentally* should be in place to give people additional stimul thus raising the probability of influencing the behaviour change.

3. Factors responsible for the change on the network level:

- *Qualities of the environmental behavior* should facilitate its adoption. In practical application to the designing of environmentally policies it means that you have to offer people such exchange options that they will be interested to be engaged in behavior change. These main qualities of new behavior are: comparative advantage to the traditional alternative, easiness to understand and adopt, trialiability and visible results.
- *Peer networks* between organizations (relationship thinking) enable the spread of environmental ideas and practices in community. Peer-to-peer communication ('word of mouth') considered to be the most effective way of information dissemination compared to other impersonal methods as mass media.
- *Different user segments* should be considered separately what allows better adjusting of the qualities of environmental behavior towards their demand. In case of sustainable transportation one should obviously differentiate between people who are already interested to make a change in travel patterns and those who are resistant to it. The later ones are obviously more demanding, expecting more benefits in exchange and requiring more attempts from the policy planners to make them travel in an environmentally sustainable manner.

The identified factors that are suggested to affect the pro-environmental behavior are partially corresponding with those proposed by Hines, Hungerford and Tomera (1986) in their model of responsible environmental behavior (Figure 3-3). Individual values and beliefs correspond to attitudes, perceived behavioral control stands for locus of control, appropriate information relates to knowledge of issues, social norms accounts for situational factors, possibilities to behave environmentally include knowledge of action strategy and action skills. As it can be observed, the factors responsible for the change on the individual level are entirely accounted for, while factors influencing interpersonal and network level are not fully considered. These additional factors might be of importance in making people to act in environmental manner and can complement the model with such predictors of pro-environmental behavior as: effective reminders, incentives to behave environmentally, qualities of the environmental behavior, peer networks and different user segments.

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│   │  Locus of    │         └──────────────┘      │ different actions    │         │
│   │  control     │                               │ to choose)           │         │
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│   │ Factors affecting the environmental behavior   │                              │
│   │ identified during literature review that can    │                             │
│   │ be added to the model:                          │                             │
│   │                                                 │                              │
│   │ ●Effective reminders                            │                              │
│   │                                                 │                              │
│   │ ●Incentives to behave environmentally           │                             │
│   │                                                 │                              │
│   │ ●Qualities of the environmental behavior        │                             │
│   │                                                 │                              │
│   │ ●Peer networks                                  │                              │
│   │                                                 │                              │
│   │ ●Different user segments                        │                              │
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Figure 3-3 model of responsible environmental behavior

Source: Hines et. al. 1986

4 Why social marketing is advantageous compared to traditional policy planning in dealing with transportation issues

In chapter 3 the predictors of pro-environmental behavior are suggested based on the explanatory theories of behavior change. These factors are responsible for change on the individual level (individual values and beliefs, perceived behavioral control and social norms), interpersonal level (appropriate information, effective reminders, possibilities to act environmentally, incentives to behave environmentally) and network level (qualities of the environmental behaviour, peer networks, different user segments). Current chapter aims to identify the elements of the social marketing that takes these issues into consideration and elaborate on how the planning process should look like within the context of social marketing approach thus helping to close the attitudinal-behavior gap in traditional policy planning.

4.1 Defining social marketing

The notion of social marketing first appeared in 1951 with the work of Wiebe who came up with the idea that methods utilized in commercial marketing can be successfully applied in the non-profit sector for the promotion of public goods and services. In the beginning of 1970s this idea was developed into separate discipline by Kotler and Zaltman. They defined 'social marketing' as *"the design, implementation and control of programs calculated to influence the acceptability of social ideas and involving considerations of product planning, pricing, communication, distribution and marketing research."* (Kotler and Zaltman 1971). This definition is close to those given by Andreason (1995) who emphasized that the bottom line of the social marketing is "to influence the voluntary behavior of target audiences in order to improve there personal welfare and that of their society" (Andreason 1995). However social marketing has common features with generic one, it appears to be more difficult and ambitious as it aims to alter "intractable behaviors, in complex economic, social and political climates" (MacFadyen *et al* 1999). Thus societal and cultural values, so-called community-based approach, should not be overlooked while applying the marketing mix to manage social behavior. From this point of view the definition given by Kotler and Roberto (1989) appeared to be more comprehensive in understanding social marketing as *"a program planning process that promotes the* **voluntary behavior of target audiences** *by offering benefits* **they want**, *reducing barriers* **they are concerned** *about, and using persuasion to motivate their participation in program activity".* Facilitation of behaviour change can be achieved through application of traditional marketing mix (product, price, promotion and placement). It should be well elaborated and never stopped adjusting to meet the changing circumstances in the market place such as customer's wants and needs, leading competitors etc.

4.2 Key elements of social marketing

Social marketing approach contains the key elements that are lacking in traditional policy planning but appeared to be crucial for the program success as they account for the behavior change factors outlined in the previous section. These are customer orientation, mutually beneficial exchange, relationship thinking and utilization of the behavior change tools (Table 4-1)

Table 4-1 key elements of social marketing linked to the behaviour change factors

Social marketing elements	Factors affecting the behavior change	Theory of behavior change
1. Customer orientation	- Individual values - Social norms - Differentiation between different user segments	✓ Theory of Reasoned and Planned Actions ✓ Theory of Diffusion of Innovations
2. Beneficial exchange options	- Perceived behavior control - Qualities of the environmental behavior - Possibilities to act environmentally	✓ Theory of Reasoned and Planned Actions ✓ Theory of Diffusion of Innovations ✓ Social Learning Theory
3. Relationship thinking	Peer networks	✓ Theory of Diffusion of Innovation
4. Behavior change tools	- Appropriate information - Effective reminders - Possibilities to act environmentally - Incentives to behave environmentally	✓ Social Learning Theory

4.2.1 Customer orientation

Before designing any program, social marketing calls for comprehensive knowledge about potential clients such as their "personalities, attitudes, previous actions, their income, the attitudes and actions of their friends and associates, … community and culture(s) they belong to" (Ampt 2003). This helps in right determination of customer's needs and wants, important for the consequent market segmentation and target audience identification who are already interested in changing their lifestyles.

In social marketing the "researching backwards" (Andreason 1985) should be applied first by asking stakeholders what they would do in case of different research outcomes prior to gathering the data required for conducting this research. Then only those data should be collected that will lead to the actionable outcomes. This prevents the potential waste of time and money when results of research "go begging for users after they have been done" (Balch 1996) and guarantee the occurrence of desired actions in the target audience.

Customer orientation principle also allows promoting products or services with careful consideration of societal and cultural context. The following example on nutrition program demonstrates its importance for successful policy outcomes. In 1960s the powder milk products were promoted to supplement breast feeding in the developing world. People, however, lack money to afford new products and mothers started to dilute the infant formula in order to make it last longer. Also, they were unable to make the sterilization of water properly. As a consequence, "the promotion of breast milk substitutes often resulted in an

erosion of breastfeeding and led to increases in diarrheal diseases and malnutrition, contributing to the high levels of infant mortality in the third world" (Waisbord 2001)

Thus, careful listening to consumers values and taking into community circumstances "leads the social marketer both to planning and reasoned risk-taking - a bias for thinking ahead, planning for contingencies … , doing and than adapting, rather than being paralyzed by uncertainties" (Balch 1996).

4.2.2 Mutually beneficial exchange

As it is highlighted by psychologists, people are acting based on their self-interests. "This interest clearly and consistently acknowledged and pursuit" in the commercial marketing (Rothschild 1999). In the socio-environmental field we want people to behave in a way that is often in conflict with there own wishes, for instance not to smoke or eat junk food, use public transportation instead of individual cars, which makes it more challenging.

In order to engage public in the behavior change, policy planners have to offer them something beneficial in response. The exchange theory from the economic discipline can be applied in this case. Obviously, if "perceived benefits . . . outweigh the perceived costs of its purchase, voluntary adoption by the consumer is most likely" (Maibach, 1993). Thus social marketing attempts to foster behavior change through provision of alternative choices to the target audience "that lead to voluntary self-interested exchange" (Rothschild 1999). Application of exchange mechanism allows attaining policy outcomes with a greater efficiency both for policy-makers and society. Obviously, the more alternatives you provide to the society, the higher is the probability that different groups will find it attractive for themselves to act in the desired by policy-makers manner thus raising the participation in the program.

However, it should be mentioned that there are many discussions about the applicability of the exchange theory in the social marketing. The main difficulty is that benefits offered are often intangible and the payback is temporally not close to the transaction, rather somewhere in the remote future. The challenge here "lies in showing individual that immediate and sometimes continuous (undesirable) behavior must take place to achieve the long-run benefits" (Rothschild 1999).

4.2.3 Relationship thinking

In the recent decades marketing discipline has experienced the intrusion of "ideas and practices informed by the nature of human relationships, the importance of networks and customer value" (Hastings 2003b). This means that marketing nowadays is moving towards more relationship practices with their consumers, not only in business to business communication supported with the development of information technologies. The IT techniques deployment in marketing communication allows reaching and treating each individual, not only the mass market segment, thus raising the effectiveness of the marketing campaign.

Relationship thinking has important contribution to the field of social marketing. That is a focus shift from transaction to "customer retention and loyalty" (Hastings 2003b) which is very advantageous when the behavior change required the long-term effort. Psychological loyalty thus can be considered as one of the reinforcing mechanism to sustain the behavior change when the benefits of exchange are not tangible and received not immediately.

The idea of relationship thinking can be extended in communication with not only customers but other stakeholders, even those who are interested in competing behavior. This delivers

competitive advantage which is crucial for successful marketing of public goods and services. "Strategic alliances with competing social marketers can facilitate efficiency savings and improve competitiveness, just as in commerce" (Hastings 2003a). For example, in public health management, water fluoridation is important component. However, it appeared that health arguments are not always a good motivator for water companies, which are private organizations and "not arms of health services" (Hastings 2003a). Though, they are obviously interested in the provision of good quality services to meet their customer's demand and the evidences from the public survey that people want fluoridation will most likely influence their actions, making water companies "long-term partners in ongoing health promotion campaigns" (Hastings 2003a). At the same time governmental health agency which is also interested in the public health issues can assist in making billings "a less negative process and improve the company's corporate image"(Hastings 2003a).

Multi-relational model proposed by Hastings (2003a) calls for importance of establishing partnerships with suppliers, buyers, lateral parties (governments and competitors), as well as inside social marketing organization between different departments and employees (Figure 4-1). The internal partnership is crucial as "fulfilling relationships with external stakeholders depend on the whole organization pulling together" (Hastings 2003a).
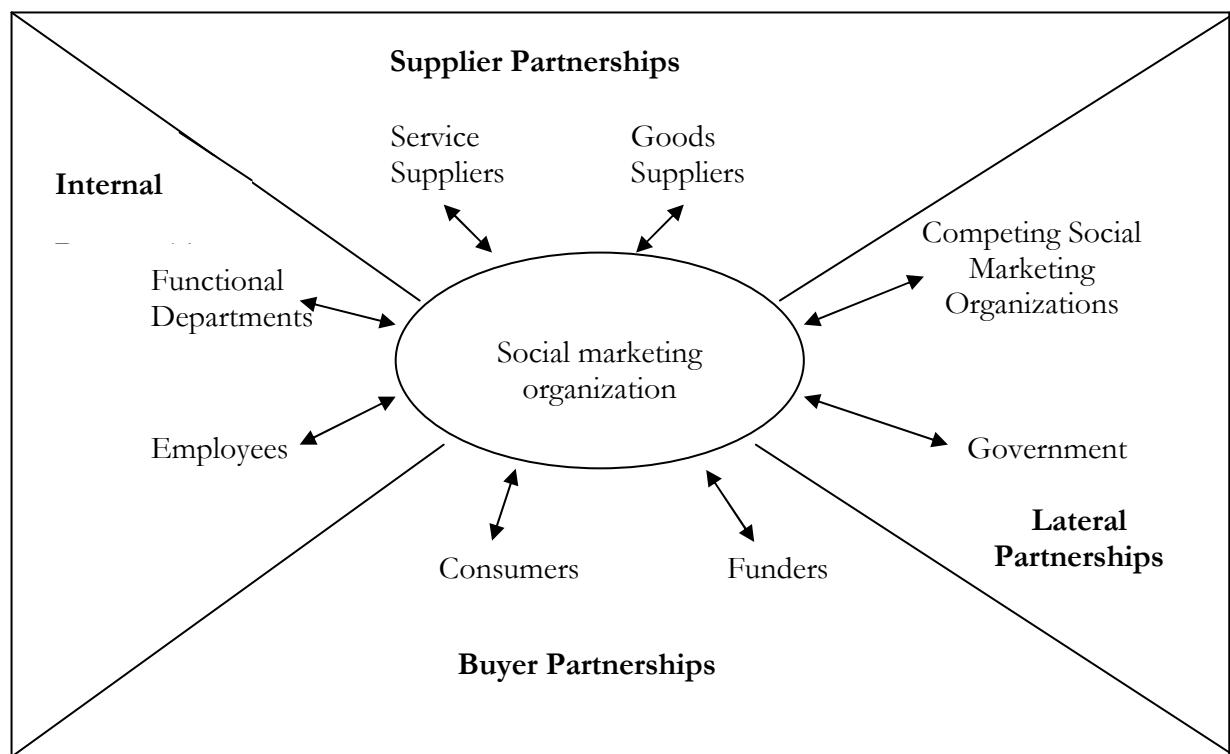

Figure 4-1 multi-relationship model of social marketing

Source: Hastings 2003a

4.2.4. Behaviour change tools

Social marketing is complemented with the insights of the behavior change theory, mainly social learning model, through the set of behavior change tools. These include (McKenzie Mohr 1999):

- Communication techniques through personalized marketing campaigns or media channels to attract the attention of potential customers to the new ideas;
- Commitments, either written or verbal, to try the new behavior and prompts which are visual reminders to conduct the action are techniques employed to make the behavior being remembered;
- Norms that guide the individual how it is worth to behave because others from one's environment already perceive it as normal and indispensable. The techniques of modeling the desired behavior through incorporation of a group of people who has already adopted the new behavior gives a clue on how to perform the action;
- Incentives that encourage person to make a change either monetary or non-monetary. The examples of non-monetary incentives utilized in promotion of sustainable transportation are summarized below in the Figure 4-2.

To conclude with deliberations provided above, it should be highlighted that social marketing adds value to the process of public policy promotion by supplementing it with insights of the behavior theory. Consumer orientation, mutually beneficial exchange, relationship thinking and utilization of the behavior change tools are the unique key elements that enable careful strategic planning, cost-effectiveness and long-term stable results of program implementation.

- Reduction of allowed vehicle speed, changes in land use patterns to decrease the convenience of travel with car

- Construction of exclusive travel lanes for mass transit to provide time savings compared to single occupant car use

- Giving preferences in parking for car users with several passengers compared to single occupant vehicle.

- Provision of matching services that allow people to find co-workers with whom they can share a car.

- Utilization of the congratulations tool where rewards are given to those people who already believe they are smart travelers

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Figure 4-2 non-monetary incentives to foster sustainable transportation

Source McKenzie-Mohr 1999

4.3 Analytical framework: program planning within the context of social marketing approach

The community-based social marketing approach was developed by McKenzie-Mohr (1999) and offers an alternative model which has been proved to be effective in fostering behavioral change (Figure 4-3). Main elements that make it innovative to the rational model (Figure 2-1, section 2-1) include:

- *Determination of existing barriers* that prevents target audience from making desired actions. Customer orientation component is thus utilized. Through the "combination of literature review, focus groups, and survey research" (McKenzie-Mohr 1999), the internal and external barriers for the behavior changes are revealed. For example, the

internal barrier can be lack of knowledge on how to carry out a specific activity as composting, while the external is the lack of required infrastructure as providing curbside collection. "Since the barriers that prevent individuals from engaging in sustainable behavior are activity specific, community-based social marketers begin to develop a strategy only after they have identified a particular activity's barriers" (McKenzie-Mohr 1999).

- *Elaboration on the strategy with use of behavior change tools.* Such variety of tools is identified with assistance of the social science research and presented in the section above. Among them are communication, commitments, prompts, norms and incentives (McKenzie-Mohr 1999).
- *Launching pilot projects* and their evaluation before starting wide community programs. This allows to refine the strategy on the earlier stage of program planning compared to the rational model, where improvements are made based on the monitoring of already implemented solutions.
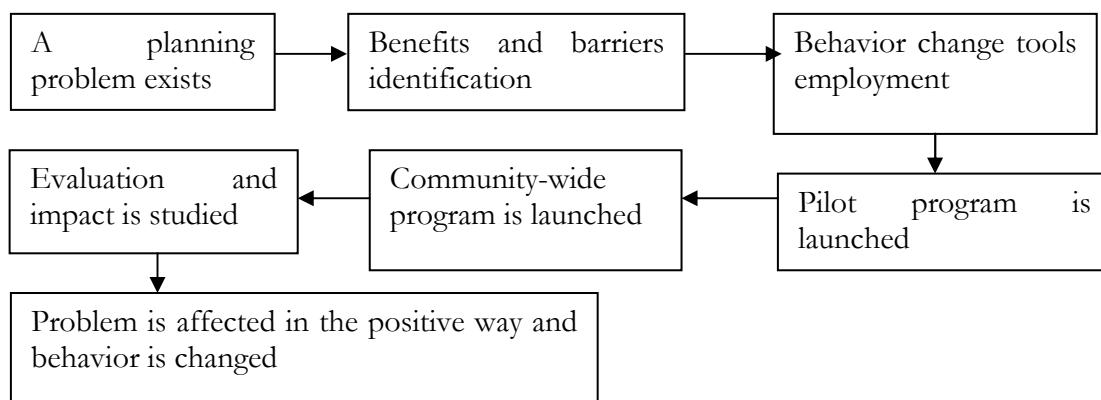

Figure 4-3 Community-based social marketing model

Source: McKenzie-Mohr 1999

Taking into consideration the community-based social marketing model offered by McKenzie-Mohr (1999) and key elements of social marketing analyzed in section 4.2 of this thesis, the following model of the program planning is suggested (Figure 4-4). Such combination allows complementing the community-based social marketing model with additional psychological insights of behavior change theories overviewed in chapter 3. Proposed policy planning process will be used in the next chapter as an analytical framework for the exploration on social marketing application in the sustainable transportation field.

The main steps include:

1. *Problem definition* within the context of how the problem is perceived by customers. This allows reaching an agreement between program planners and people on actual and desired state of the problem, which is crucial for the success of the designed strategy. **The individual values and beliefs of people, social norms are accounted for here through the customer orientation component.**

2. *Target audience identification.* Application of market segmentation technique inherent for generic marketing allows identifying the customers who are already interested in changes thus making it easier to alter their behavior in the desired manner, as well as differentiate between

demands of different user groups. **The factor of different user segments is accounted for here through the customer orientation component.**

3. *Barriers and benefits identification* allows considering the obstacles and drivers for the desired change that are existing in the target audience. Their careful consideration and utilization contribute to strategic planning improving its effectiveness in achieving desired outcomes. **The individual values and beliefs of people, social norms are accounted for here through the customer orientation component.**

4. *Different exchange options formulation.* These options are alternatives to the current behavior and are formulated with the application of exchange theory conventional in traditional marketing. The main idea behind is to create the situation where the "voluntary self-interested exchange" (Rothschild 1999) is happening: people act on the basis 'we wish because we are interested in' rather than 'we need because we have to'. **The factors of perceived behavior control and qualities of the environmental behavior are taken into account here through the mutually beneficial exchange component.**

5. *Behavior change tools identification* such as norms, prompts, communication, commitments and incentives (McKenzie-Mohr 1999) allows assisting the exchange happening with the higher probability, raising the effectiveness of the policy implementation. **The factors of appropriate information, effective reminders, possibilities and incentives to behave environmentally are accounted for here through the behavior change tools component.**

6. *Policy implementation* should start with a pilot and only then disseminated to community-wide scale. This allows making improvements to the program at the earlier stages before the huge investments are put in and refine the strategy till achieving the high effectiveness. **The individual values and believes, social norms are accounted here through the customer orientation component. The impact of behavior realism on policy implementation is thus monitored during piloting before wide scale launching of the program.**

7 and 8. *Monitoring and adjustment; policy redesign.* After the program has been implemented on the wide scale, the constant monitoring should take place in order to never stop adjusting the strategy towards changing circumstances in society such as people's preferences, competing actors etc. The situation can appear when the cultural beliefs are changed and thus not simple adjustment rather whole policy redesign will be required. **The individual values and believes, social norms are accounted here through the customer orientation component.**

9. *Stakeholder involvement.* All of preceding steps are not performed independently from the community where the changes are modeling. Only careful listening to customers, consideration of societal and cultural context, building strategic alliances with competing actors, peer networks will allow to plan program in effective and efficient way. **The factor of peer networks is accounted through the component of relationship thinking.**
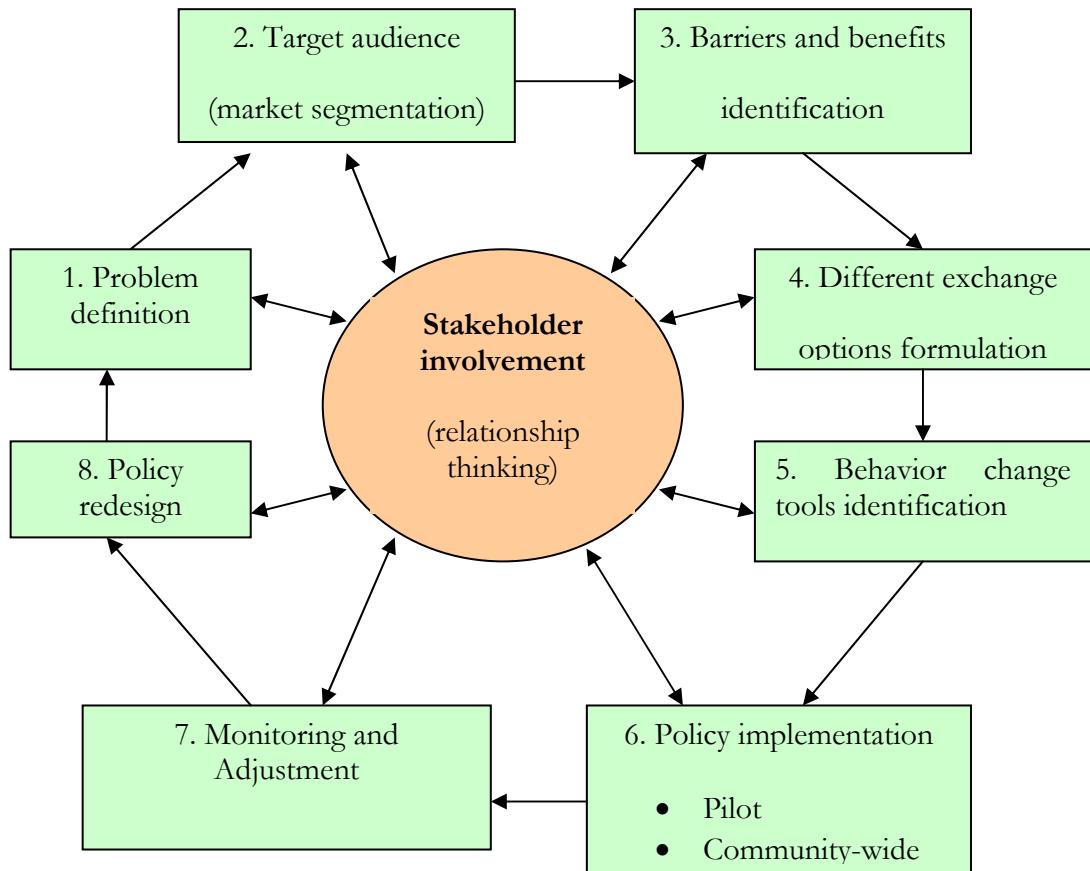
Figure 4-4 Analytical framework: policy-planning process within the context of the social marketing.

Source: developed by author based on the community-based social marketing model proposed by McKenzie Mohr, 1999

As result of application the social marketing approach to the policy planning process, the main drawbacks of the rational planning model can be addressed (Table 4-2).

Table 4-2 Strengths of the social marketing approach that allows fixing the weaknesses of traditional policy planning

Weaknesses of traditional policy planning process based on rational planning model	Strengths of the social marketing approach
• Focus on the one best alternative which does not provide people with the choices that better suits their own needs and concerns	• People are provided with different alternative solutions (exchange options) to the problem so that they can peak up those one which better suits their demand.
• Reliance on the external experts rather than stakeholder participation in the process of decision-making. If community involvement is considered, it is often limited to the information provision	• Relationship thinking makes possible the involvement of all stakeholders into all steps of the program planning. This allows better adjustment of policy strategy to their needs and concerns, social norms.

• Inequity in power distribution among participated stakeholders (command–control principle).	• Equity in power distribution: people are left to decide by themselves when and how to act in the environmental manner
• Non-consideration of the ground realities on how people behave in response to the policy measures (no piloting before implementations).	• Careful consideration of the behavioral response to the policy measures (piloting before implementation)

5 Case studies

Current chapter aims to investigate consideration of social marketing approach in sustainable transportation planning in Lund and Malmo, with particular focus on cycling, public transportation and car sharing. With this purpose the analytical framework of policy planning within the context of social marketing approach is applied (section 4.3, figure 4-4). The following essential elements innovative to the rational model conventionally applied in urban transportation planning are considered: problem definition within the context of customer's needs, target audience, barriers and benefits, exchange options, behaviour change tools, piloting, monitoring/adjustment and policy redesign.

5.1 Lund

5.1.1 Transportation situation in Lund

Lund is the medieval university city located in the Skane region, in south Sweden. It includes the Lund town and four surrounding villages: Soedra Sandby, Dalby, Genarp and Veberoed. Being a twelfth largest municipality in Sweden, it accommodates 105 000 inhabitants, with 75 000 people in the town itself. Among them are 38 000 students and 5 500 teachers/researches (pers. comm. Anders Soderberg).

Situated in the center of the fast developing Oresund region, Lund earned the reputation as the city of ideas and creativity (Lund Municipality 2009). Many international companies found its place here like Sonny Ericsson, Tetra Pak, Axis AB etc. As result it becomes a meeting point for the large number of people. Every day, 28 000 and 15 000 of people travel into and out of Lund correspondently, with 36 000 persons passing Lund central station making it the fourth largest one in Sweden (pers. comm. Anders Soderberg). Such high travel patterns indicate the importance of mobility management activities to ensure the sustainable transportation system in the city.

The current modal split in Lund is presented in the Table 5-1 (pers. comm. Anders Soderberg). As it can be seen, still nearly half of trips which are often less than 3 km (around 20% of it, Trivector 20008) are done by cars, and the great potential exist in increasing the use of public transportation.

Table 5-1 modal split in Lund

Transportation mode	By trips	By person km
1. Cars	45%	55%
2. Walking/biking	40%	15%
3. Public transportation	15%	30%

Source: pers. comm. Anders Soderberg

Lund is known for its long history of dealing with transportation issues, which started in the early 1970-s when a planned motor way through the city center in order to increase the access of cars was banned. Later, in 1972 the car restriction measures in the city center resulted in decrease of car traffic flow from 21 000 to 3 000 vehicle per day (Ljungberg 2007). In 1985 along with the worldwide environmental movements, a lot of investigations were done by municipality in the field of sustainability, including the transportation issues. The public transportation projects were launched including car free zone, pedestrian areas and bicycle facilities. In 1996 the Municipal Agenda 21 and the new "Master Plan" for the city were established with the environmental goals set as a priority. Starting from 1999 the Mobility Office was organized and the ambitious goal to create the Environmentally Adapted Transportation System (LundaMats) was set (Ljungberg 2007, pers. comm. Anders Soderberg).

The LundaMats I was launched in 1999 with the main goal to achieve GHG emissions reduction. The project was partially sponsored by grant given by the Swedish Department of Environment, partially by municipality (pers. comm. Pernilla Hyllenius). In the next three years approximately 120 million SEK were spent on different measures to improve the transportation system in Lund, while the total expenses are expected to be up to one billion SEK (Lund Municipality 2009b). The main reforms include (Lund Municipality 2009b):

- *Town planning.* This reform targets the sound land use planning to ensure transport optimization through the set of measures: stricter demands of environmental impact assessment in regard to construction activities, construction of supportive infrastructure to promote environmentally sustainable forms of traveling, local production support etc.

- *Bicycle city.* This reforms aims "to make Lund as a bicycle city of a true European dignity" (Lund kommun report) through the set of measures: expensive bicycle facilities like dedicated pathways, priority to cyclists compared to other forms of commuting etc.

- *Public transportation extension* aims further to discourage the use of private vehicles through the set of measures as bus priority system, intermodality of traffic system which makes it easier to change the travel modes when required (cycle & park & take a train & car pool), opening of Lundalink in 2003 which is 10 km long bus highway connecting the centre of Lund with the main business areas and outer city etc.

- *Environmentally friendly car traffic* aims to decrease the negative effects of driving through technical measures such as alternative fuels or more advanced engines, eco-driving etc.

- *Improvements in the field of industrial transportation* pursue to make the distribution of commercial goods and travel of company's employees in a more sustainable manner. The first is reached through the logistic improvements, full trucks loading, while the last one through carpooling/sharing, encouraging the use of public transportation, telecommuting etc.

Thus the LundaMats represents the integrated approach to achieve sustainable urban transportation. Through the combination of hard and soft measures, though the focus is given on facilitation of voluntary change in transportation patterns, it appeared to be successful in traffic decrease, the LundaMats was further adjusted to suit the mobility needs. In 2006 the LundaMaTs II was created, with concrete targets towards decrease in traffic volumes for 2030 (pers. comm. Anders Soderberg). This time the rationale include not only the GHG reductions, but also creating the sustainable city environment "with improved access, security, and traffic safety, better health, more efficient land use and a developed character in the city, towns, municipality and region" (Lund Municipality and Trivector Traffic AB 2007). The reform areas

appeared to stay the same with more emphasis on developing pedestrian traffic and addressing the mobility management issues, which involve measures of travel behavior change towards more sustainable alternatives and efficient use of transport system. The investments are estimated to make up 1-3 billion SEK, while the implementation costs account for 75-80 million SEK (Lund Municipality and Trivector Traffic AB 2007).

The LundaMats II strategy is represented in the form of a wheal (Figure 5-1) (Lund Municipality and Trivector Traffic AB 2007). The central core represents the main conditions (planning, management, co-operation, follow-up, and implementation) necessary to be met to increase walking, cycling and use of public transportation, while decreasing the individual vehicle driving. The circle around shows the importance of conducting such activities as constant dialogue and consultation, information provision, marketing campaigns and training to attract the attention of people and involve them in the project. The next circle includes the main reform areas, while the outer one specifies the concrete measures which have to be developed to achieve the required improvements in the reform areas.
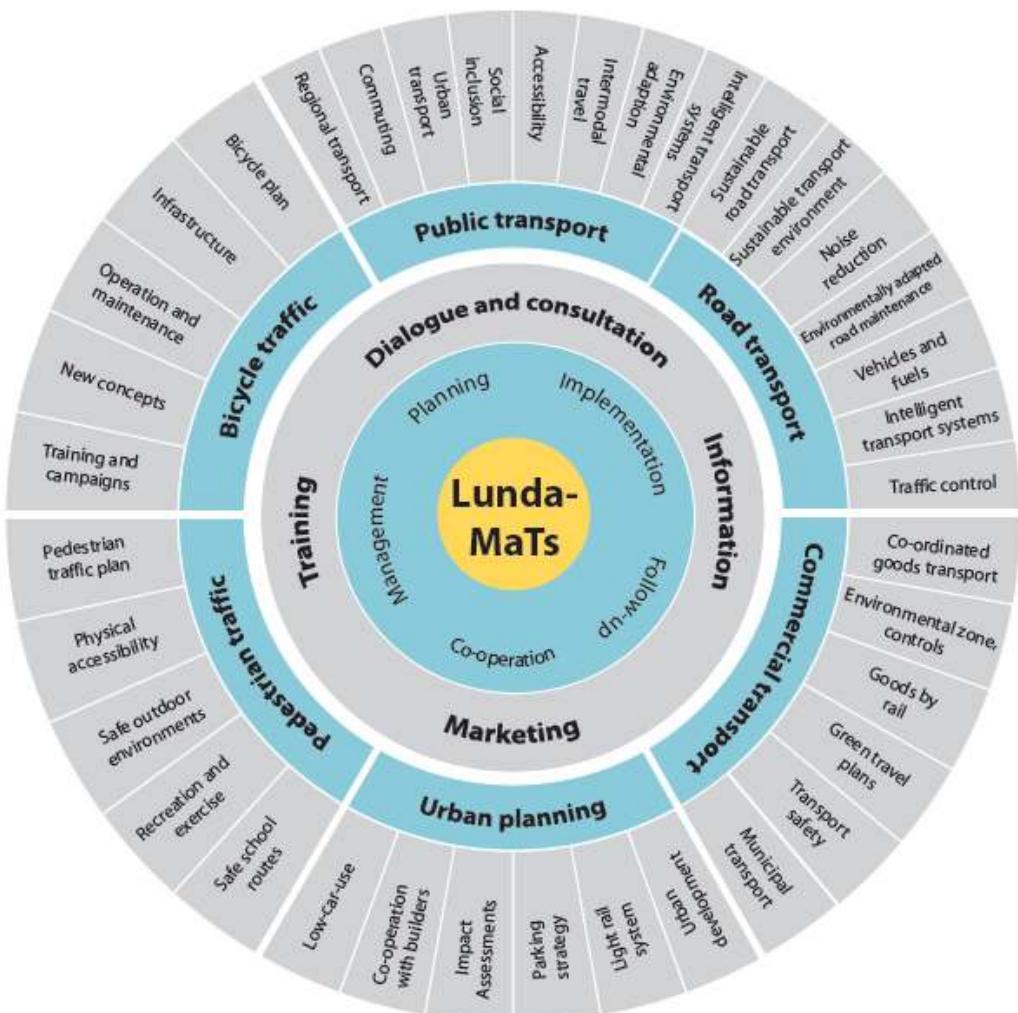

Figure 5-1 LundaMaTs II strategy

Source: Lund Municipality and Trivector Traffic AB 2007

5.1.2 Cycling

In Lund the priority in transportation planning is given for walking and cycling, and only then to public transportation. It has already become one of the foremost European bicycle cities. The urban planning that takes into consideration the promotion of cycling has started from 1972 with the first Master Plan for Lund where the initial ideas to create bicycle facilities were considered. In 1992 these ideas received a strong political support and active measures to make cycling a sustainable alternative were undertaken. As a result, the bicycle traffic has increased from 142 000 km/day in 1993 to 180 000 km/day nowadays, depicting the nearly 25% increase in the last 17 years (pers. comm. Anna Karlsson).

5.1.2.1 Problem definition

Before starting planning, it is important to understand what hinders the cycling activities and how to attract citizens to cycle more. It was recognized that the main problems are lack of supportive infrastructure, which ensures safety, accessibility and convenience, as well as lack of comprehensive information for citizens on how they can use bikes for the every day commuting. To solve the problem the following goals were set (Lund Municipality and Trivector Traffic AB 2007):

- to improve infrastructure for bicycle traffic, i.e. built the new paths and cycle garages where necessary and increase the quality of existing ones

- to ensure safety of bicycle routes

- to conduct campaigns to increase public awareness and engagement in cycling

In the period from 1999 to 2005 about 60 million SEK were invested to improve infrastructure for bike facilities and additional 20 million SEK for different campaigns to encourage the cycling (pers. comm. Anders Soderberg).

5.1.2.2 Target audience

In cycling promotion, the market segmentation method is applied. First of all there is strong differentiation between those who already bike and potential cyclists. To maintain the existing customers the travel questionnaires are conducted every five years to collect data on how people perceive the situation on the roads: whether they are satisfied with quality, safety, accessibility, maintenance issues etc. (pers. comm. Anna Karlsson) so that problems are constantly redefined and the emphasis is put on solving the existing weaknesses in the system. Among the potential clients the main targeted group are those people who already travel unsustainably, that is car drivers. In order to shift them to cycling activities the "Health-bikers" campaign was launched.

In addition to targeting individuals, the promotion of cycling is made within companies, such as Sony Ericsson, TetraPak, Axis, Alfa Laval and Ideon Science Park. With this purpose the top management of the companies is contacted to encourage their employees to cycle to work, convenient bike paths and parkings are created, the showers and changing rooms are built at the work places. One of the recent activities is "Skane trampar" (pers. comm. Anna Karlsson and Anders Soderberg) which calls citizens, including companies, to participate in the biking competition.

5.1.2.3 Barriers and benefits

The main barrier on the way to cycling is safety issue. People appeared to be frightened of road traffic. With purpose of removing such obstacle the road priority is given to bicycles during non-pick hours, technical measures are conducted, such as separation of bicycle lanes from traffic with green belts what at the same time makes cycling paths more attractive looking from the aesthetic point of view, bumps on the roads and thousands of 'red carpets' on the intersections control the vehicle speed, the cycling routes are clearly marketed with colored signs and lighted when it becomes dark (pers. comm. Anna Karlsson).

Another barrier is the security issue connected with the bicycles thefts, which were quite often in Lund until 1996. With the purpose to reduce thefts the Lundahoj service was established on 17th February, 1996 which provides citizens with guarded parking spaces. It was the first organization of such type in Sweden. Thefts have been halved what was highly appreciated by local population and visitors. Besides the supervision of parking facilities, the anti-theft marking has been introduced and due to it nearly 1600 bicycles are returned to their owners. Nowadays Lundahoj has extended its services to rent different types of bicycles (standard and tandem, for the handicapped, children) as well as associated equipment like children seats and trailers, guiding consumers with information about safe routes and good locks, provision of emergency repairs and compressed air, training children at school about road traffic and organization of different fairs and events dedicated to bicycle promotion (pers. comm. Anders Soderberg).

Also, the obstacles associated with inconvenience of bicycle use when you have to switch to other travel modes are decreased through allowances to take bicycles on board of some intercity busses and trains (detailed information is given in leaflets disseminated at Skanetrafiken offices) and construction of high standard bicycle parking facilities in the immediate vicinity to bus and train stations called Bike'n'Ride project. Lund railway station, for instance, includes up to 5000 parking places for bikes, what allows huge economies of scale. Just to compare: such area can accommodate only 20 cars (pers. comm. Anders Soderberg).

Regarding benefits, which cycling can offer, it was revealed that citizens most value: saving money, time and health improvement. During "Health-bikers" campaign it was shown through health check-ups that only 10 minutes of cycling every day bring visible results to heart, lung activities and good physical form. The establishment of on-line calculation tool called pendlometern (translated from Swedish as commuter computer) allows calculating time, money savings and burned calories from cycling in comparison to conventional car use. This allows visualizing associated benefits what further spurs switching to sustainable alternative (pers. comm. Anders Soderberg).

5.1.2.4 Exchange options

The cycling is in itself already one of the proposed options to switch from the private vehicle use to the environmentally friendly alternative along with walking, public transportation and car sharing. The Smart Transportation Concept was created calling for choice of transportation mode depending on occasion: car for long-distance travel out of the city, public transportation or biking to go to friends who are living within the city, walking for short distances if you go to buy the newspaper in the nearby shop etc. In exchange, the smart commuters are benefiting with good economy, time efficiency, good health and better environment.

"Health bikers" program mentioned before is the well-elaborated alternative for the most resistant to changes audience such as car drivers. According to it, the car users were provided with free cycle equipment such as rain jackets, lightning, bike computers for speed control, sometimes even with bikes. In response they were committed to experience cycling for a year. The health evaluations before and after the program were conducted to show participants the improvements in life quality. The program appeared to be very successful, approximately 85% and 60% of participants continue to bike within and after one year correspondently after the program was finished (pers. comm. Anna Karlsson). However, it was quite costly, health check-ups for each person account for 800 SEK and additional cycling equipment makes up at least 1000 SEK per health biker (pers. comm. Anders Soderberg).

"Bike to work" option which is promoted through constant dialogue of municipalities with companies proposes to count cycling time to work as working hours. It is believed that it will benefit each individual with better health and at the same time the whole company as healthier employees are contributing to the business success through being more active, creative and innovative (pers. com. Anders Soderberg).

5.1.2.5 Behavior change tools

The number of behavior change tools to influence the transportation choices of people is utilized. The individualized marketing campaigns are constantly carried out to give people full information about the negative environmental effects of car driving and encourage them to try biking instead. The most effective ones are those related to health issues of individuals and their children, as well as noise level. Since 2002, 40 000 houses has been visited for door-to-door communication that costed approximately 4 million SEK. The information is also provided during marketing campaigns on the streets when special pockets with leaflets and little presents are disseminated among the public. This happens quite often especially during public holidays and weekends (pers. comm. Anders Soderberg). Municipality is issuing and constantly updating the cycling maps that are disseminated among the public. They contain the information on existing bike routes each of which has its own color for better navigation (pers.comm. Anna Karlsson).

'Cyclists Education' is another initiative to spread the bicycle use. As sometimes the obstacles to be engaged in activities are connected to lack of knowledge on how to perform it, the bike riding courses for immigrants are organized, as well as bike maintenance training. The employees at companies are offered bike repair courses. Children at schools are also educated about sustainable forms of commuting such as cycling (pers. comm. Anders Soderberg).

Cycling in Lund has already become a norm. Demonstrative bikes among some university buildings as well as information signs throughout the city serve as reminders for people about existence of much more convenient and sustainable alternative.

Among incentives utilized are the priorities for cyclists during non-pick hours, congratulations for those who already believed to be a smart traveler, small gifts for consideration of alternative options, organization of competitions between bikers, locating bike parking facilities near the companies in much closer and convenient places than car parking, company bicycles available for work trips, building of showers and change rooms at working places (pers. comm. Anders Soderberg).

5.1.2.6 Stakeholder involvement

The crucial factor that contributes to success of the project "Lund, the city for cyclists" is high level of stakeholder's involvement, especially the strong support of politicians from all parties.

As it was mentioned before, Lund has a long history of dealing with transportation issues, and involvement of different parties at different stages of problem solving resulted in agreement about the general strategies of transportation policies. Among other stakeholders are civil servants/city officials. High collaboration between different city departments allows accelerating efforts to ensure sustainable city traffic. For instance, inclusion of transportation issues in the City Master Plan enable urban planning that guarantee consideration of sustainable travel alternatives. Different companies as Sony Ericsson, Tetrapak, Axis, Alfa Laval, Ideon Science Park etc. are also active participants of the project. Promotion of healthier environment for their employees and awareness of sustainability issues create the image of social responsibility that makes them more attractive partners in the business environment and serves as examples for other companies to be engaged in the same activities. Strong involvement of individuals, consideration of their attitudes and needs further contributes to the success of transportation policies. The consultancy organization Trivector is also involved in transportation planning through carrying out external evaluations of the program and providing recommendations for further improvements (pers. comm. Anders Soderberg, Anna Karlsson).

5.1.2.7 Piloting, monitoring/adjustment, policy redesign.

Piloting is an important step of program implementation. Though Lund is in itself a small community city, before building the vast bicycle infrastructure throughout the whole town first bicycle lanes were constructed in designated places and only then further construction was continued as the demand appeared.

The Cyclist's Reference group was created which consists of the experienced cyclists who constantly provide their feedback about the required improvements of the bicycle infrastructure. Every five years the travel surveys are carried out among the residents to know whether they are satisfied with existing facilities, what drawbacks they concerned with and what updates in the system they would like to see in the future. The open telephone line to support the cyclists is created where they can share opinions and complaints regarding their cycling experience. This allows regular adjustment of the system to better meet customer needs (pers. comm. Anders Soderberg, Anna Karlsson).

5.1.3 Public transportation (bus ridership)

Promotion of public transportation in Lund is the important part of creating sustainable traffic environment. From 1995 to 2004 the public transportation (which is mainly bus ridership) has increased approximately by 10-15% (Ljungberg Trivector report), currently accounting for 30% of trips if measured in person kilometers. To increase the share of bus ridership, the efforts were put to create the high quality system of public transportation. The expenses are estimated to account up to 60 million SEK to improve the existing urban transportation system and additional 560 million SEK to create the two light rail systems which is still in the project stage (Lund Municipality and Trivector Traffic AB 2007).

5.1.3.1 Problem definition

From the perspective of problem definition, the main purpose of improving and extending the public transportation is to discourage the use of private vehicles. In order to achieve this target the qualitative improvements were prioritized such as to make busses faster, accessible more convenient and cheaper alternative. The main goals set are (Lund Municipality and Trivector Traffic AB 2007):

- To improve and extend bus infrastructure

- To develop bus-priority system

- To make busses accessible to all

- To increase intermodality (combination with other travel modes)

5.1.3.2 Target audience

Different groups of people are targeted to promote the use of public transportation. The great effort is put to encourage people who are not yet considering the use of such an alternative. The most resistant car drivers are treated through individualized marketing campaigns and different offerings to try the new behavior such as "Test riders" project. Employees at the companies are encouraged to use busses through creation of bus stations closer to the work places. The retired people are provided with the special grey busses which ride longer routes turning into housing areas to create more comfortable and accessible way of commuting. The access for disabled people is also improved: the free spaces in busses are created to locate the wheelchairs (pers. comm. Anders Soderberg).

5.1.3.3 Barriers and benefits

The main barriers people are concerned with when considering the use of public transportation are possible delay due to slower transit and accessibility to required destination, as well as comfortability. To overcome such barriers, the high quality highway called LundaLink was created in January 2003. It has a bus priority system and goes through Lund central station, University hospital, Lund University and main business areas in the city. LundaLink ensures the fast transit with the high level of accessibility to required destinations. The real time-tables are available on-line as well as directly at bus stations on the electronic tableaus where the time left to arrival of busses is pointed out (pers. comm. Anders Soderberg).

To ensure intermodality associated with use of public transportation, the bus stations and parking facilities for cars and busses are planned together so it becomes convenient to switch between different travel modes.

Main benefits associated with switching to busses are money savings, time efficiency, free time to read the book or communicate with peers, independence and better environment resulted in the better life quality for citizens. The use of public transportation resulted in economy of scales for parking places that allows clearing more spaces in the streets for pedestrians and cyclists, increasing their safety and improving the aesthetic scenery of the streets (pers. comm. Anders Soderberg).

5.1.3.4 Exchange options formulation

The main exchange option to make car drivers to get on busses is "Test-riders" campaign. The aim of project was to divert half of the regular car users to commuting by busses. For a month or two the car drivers that committed to try new alternative were provided with free buss passes. The impact of campaign on car traveling in Lund is presented in Table 5-2. During campaign nearly 95% of participants started to use the public transportation system at least 3 times a week. After one year of finishing the project nearly 40% of targeted group continue to ride busses. This results in car traveling reduction by 82 000 km during running the program and further by 200 000 km during next year (Hyllenius 2003, pers.comm. Pernilla Hyllenius).

Table 5-2 results of test-riders campaign

Time period	Percentage of people that started to use busses at least 3 times a week	Percentage of total trips
Before campaign	0%	<5%
During campaign	95%	70%
After 12 months	40%	30%

Source: Hyllenius 2003

Also, after construction of LundaLink different companies located in proximity to the route were visited to give people one day free passes to try the new option (pers. comm. Anders Soderberg).

5.1.3.5 Behavior change tools

Among the behavior change tools utilized are individualized marketing campaigns already mentioned in section 6.1.1.5. The same smart transportation concept is presented to citizens to make them more aware about the negative issues associated with car driving and benefits they can receive in exchange by switching to bus ridership. As it was revealed people often do not know how to catch the busses, where the bus stations are located, where to buy the passes. Comprehensive information is provided by door-to-door communication and in leaflets at Skanetraffiken offices.

Over the years different demonstrations have been organized to entail the days of traveling without cars (for instance, one of such campaign is called "In my city without a car"). During such days the information is disseminated to people on the streets such as leaflets, timetables and little gifts. Also competitions are organized between companies and those with the highest number of environmentally-friendly commuters are given an award. All of such projects aim to raise awareness and remind people about existence of much more sustainable options than driving individual vehicles (pers. comm. Anders Soderberg).

The incentives to promote bus ridership are discounts for bus passes, bus priority system on the roads, location of bus stops in proximity to work places and real time-tables of busses on the electronic tableaus at the bus stations.

5.1.3.6 Stakeholder involvement

The stakeholders involved are individuals at household and company levels who are actively involved in the process of decision-making and engaged in associated activities through a number of marketing campaigns described above. The major stakeholder is Skanetraffiken, the provider of public transportation services in the region of Skane. The key success factor is that company is run by the government servants who are very much concerned with sustainable transportation and public health issues. Skanetraffiken is operating not only to pursue profit but to create benefits for the whole society (pers. comm. Anders Soderberg). City municipality is also important stakeholder responsible for planning and implementation of projects to promote the use of public transportation, inclusion of it in the Lund Master Plan and

collaboration with different departments. Trivector consultancy firm is involved through provision of external evaluations of associated projects and issuing recommendations for the further improvements.

5.1.3.7 Piloting, monitoring/adjustment, policy redesign

Piloting is an important part of public transportation planning process. The bus routes are constantly extended step by step to ensure better accessibility of citizens to different destinations and tested on whether demand is fulfilled and people are satisfied. For instance, it is planned to open new bus stops in the South of Lund this summer mainly to encourage the employees at Tetrapak to ride busses.

The travel surveys among people using bus systems are regularly conducted to know about their experience and opinions about possible improvements they would like to see in the future. This allows adjusting the public transportation system to better serve customer's needs (pers. comm. Anders Soderberg).

5.1.4 Car sharing

 "Car sharing is an automobile rental service intended to substitute for private vehicle ownership" (Litman 1999). In car-sharing scheme a group of people shares the use of one or more vehicles. The principal difference from the traditional car renting lies in the possibility to book the car for short time periods and in extended rental contract giving the opportunity to use the car for the required number of times rather than once (Schillander 2003). Car sharing schemes provides a number of environmental benefits through increase in utilization efficiency and possibility to run environmentally friendly vehicles, at the same time facilitating the use of other alternatives, such as walking, cycling and public transportation (Litman 1999)

In Lund the initiative to launch car sharing projects started in 1998. Nowadays two main companies are providing such kinds of services: Lund's Bilpool and Sunfleet (pers. comm. Linda Medberg). Lund's Bilpool is an open non-profit local car-sharing organization, which owns twelve cars shared between 240 residents (meaning one car per 20 residents). All cars are of good quality and less then 3 years old (pers. comm. Per Muhrbeck). Among them are few hybrid cars and those run on diesel. Sunfleet company, on the opposite, is operating on the commercial basis and is part of Hertz and Volvo Sweden. It is available in Malmo, Lund, Goterborg, Stockholm and some other cities in Sweden. More than 5 000 people are members of 60 pools, three of which are located in Lund (CIVITAS 2009).

5.1.4.1 Problem definition

The main problem area is to reduce driving of individual vehicles at the same time ensuring access to it when required. The solution to it is organization of car sharing scheme which aims to ensure sustainable and safe traffic to benefit the whole community. The following requirements are set (pers. comm. Per Muhrbeck):

- High quality vehicles (emissions should not exceed 120 grams CO_2 per km) not more than 3 years old for Lund's Bilpool

- Only green cars for Sunfleet

- Compliance with European standards on vehicle safety

5.1.4.2 Target audience

Different types of people are involved in car-sharing. They are half individual members and half family members with wide distribution of age and professional activities, joining car sharing due to different reasons such as economic advantages, necessity in the second car or environmental awareness. In addition, small companies are part of the scheme. They use cars during the working hours when the demand is low what allows additional increase in the utilization efficiency of the vehicles. There is no specific distinction in targeting different user groups (pers. comm. Per Muhrbeck).

5.1.4.3 Barriers and benefits

The main barrier associated with car sharing is feeling of impersonality in owning the car. In order to overcome such barrier the emphasis in marketing campaigns is put that car sharing scheme is a great opportunity to having your own car, which allows saving money and increase utility to the user as one does not have to worry about maintenance, insurance, parking fees etc. In Lund's Bilpool the proportion of one car shared by twenty people allows increasing the feeling of personal owning, security that other partners are responsible for keeping the car in good condition and create the 'family atmosphere' between members (pers. comm. Per Muhrbeck).

The benefits of car sharing, as it was already mentioned before, are money and time savings as you do not have to worry about associated services of owning the vehicle. Once the fixed costs are paid for the membership, one has to pay according to the driven kilometers ('pay per use basis') (pers. comm. Per Muhrbeck). According to some estimation if there is no necessity to use private vehicle ever day for commuting to work and on average the person drives less than 6000 miles per year than car sharing is a good alternative for good economy (Liman 1999). In addition, high technical quality requirements of cars result in environmental benefits due to less emissions and noise as well as safety on the roads.

5.1.4.4 Exchange options

Car sharing is an alternative to individual car. The investigation has shown that in Lund on average one shared car allows substituting 5 individual vehicles and correspondent amount of parking places, additionally contributing to sustainable traffic by increasing the use of other travel alternatives as cycling and public transportation (pers. comm. Anders Soderberg). The car pooling stations are available in Lund, but no any test offers are elaborated to make people first try and experience the option compared to cycling and bus ridership promotion (as 'health-bikers' and 'test-riders').

5.1.4.5 Behavior change tools

The individualized marketing campaigns are organized (door-to-door communication) by the Mobility Office where car sharing is introduced to people as one of the options of smart transportation concept (pers.comm. Anders Soderberg). The result of applying such a behavior change tool is high level of awareness with car sharing among Lund's citizens compared to the rest of Sweden (Table 5-3).

Among the incentives offered are affordable prices (to become a member of Lund's Bilpool one has to pay deposit of 2 000 SEK, annual fee accounts for only 1200 SEK, which is extremely cheap), convenient location of car pooling stations to housing and working areas, easiness to book a car through on-line services. The payments for using the shared cars are based on amount of driven kilometers, which is an additional incentive to drive less (pers.

comm. Per Muhrbeck). On average, the member of car sharing scheme "drives only about two-thirds as much as earlier" (Schillander 2003). To involve the companies to increase the car use efficiency as they require them during working hours when the demand is low, additional lowering of prices is offered. For instance, in Lund's Bilpool the annual fee for organizations can be reduced to 300 SEK if the company supports car sharing organization with different kinds of services like coffee catering, assistance in meeting organization etc (pers. comm. Per Muhrbeck).

Table 5-3 awareness with car sharing issues in Lund

Level of awareness	Percentage of people in Lund, 2001	Percentage of people in Sweden, 1999
Well-known to me	32,5%	15%
I have heard the expression	51%	42,5%
I have never heard about it	16,5%	42,5%

Source: Hyllenius 2003

5.1.4.6 Stakeholder involvement

As was mentioned above, among the stakeholders involved are individuals, families and small companies. Also, there is support of municipality where civil servants disseminate knowledge about car sharing possibilities existing in Lund. In addition, Lund's Bilpool is cooperating with Lund Energi which is sponsoring its gas cars and local housing company owned by municipality. The last one is advertising the car-sharing parking lots when selling the flats thus promoting Lund's Bilpool among the residents. The economic advantage of such cooperation is economy of scale for parking facilities and thus saving more area for building bigger houses with more flats (pers. comm. Per Muhrbeck).

5.1.4.7 Piloting, monitoring/adjustment, policy redesign

Car pooling in Lund is now implemented on the small scale and can be considered as being in the pilot phase, even though the existing demand is fully met. Before establishing car pool stations in certain locations the local needs are carefully investigated and car sharing activities are promoted among the population. The feedback forum is organized where the customers can share their opinions and experiences of car sharing as well as provide recommendations for further improvements. The meetings of car sharing board are regularly held where people are very invited to know more and share ideas about provided services (pers. comm. Per Muhrbeck). All of these allow adjusting the undertaken measures to the customer's requirements, which is very important for making them engaged in car sharing activities.

5.1.5 Changes in travel behaviour in Lund

As result of measures undertaken since 1998 in Lund the following changes have occurred in the travel behaviour among residents (pers. comm. Anders Soderberg, pers. comm. Pernilla Hyllenius):

- 2001: 8% of people changed their behaviour what resulted in 900 tonnes less CO2 emissions

- 2004: 16% of people changed their behaviour what resulted in 2 500 tonnes less CO2 emissions

- 2008: 24% of people changed their behaviour what resulted in 4 000 tonnes less CO2 emissions

More precise data depicting contribution of each measure associated with promotion of cycling, public transportation and car sharing for the year 2004 are represented in Table 5-4. Total decrease in car driving accounts for 10 km/year what is nearly 3% compared to business-as-usual scenario (without LundaMaTs).

Table 5-4 results of transportation policies in Lund in 2004

Changes in travel patterns	Million km/year	Tonnes CO2/year
Shift from car to bike	5	1300
Shift from car to public transport	5	1000
Car pooling, eco-driving, car sharing	0,7	250
Total	10	2500

Source: Ljungberg 2007

Changes in travel behaviour can be also noticed in the statistics representing annual traffic volumes (Figure 5-2). As it can be observed, there is a strong increase in use of bicycles and public transportation while car driving has slightly decreased (Ljungberg 2007).
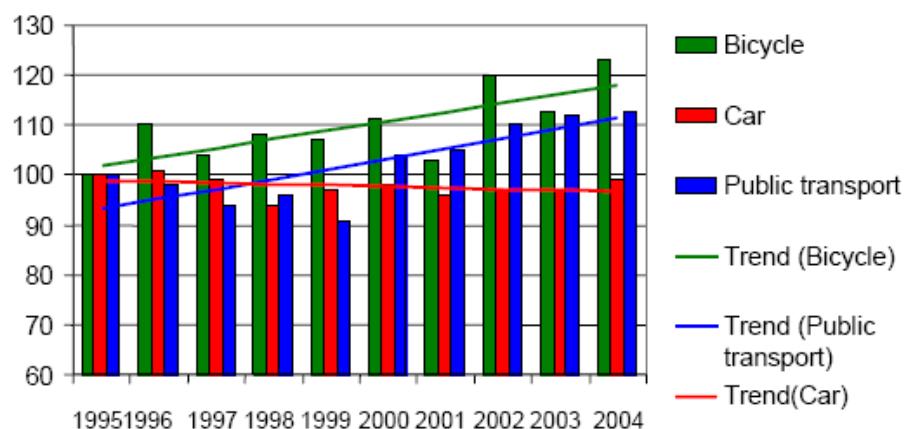

Figure 5-2 traffic volumes in Lund (1995 is a base year = 100%).

Source: Ljungberg 2007

5.2 Malmo

5.2.1 Transportation situation in Malmo

Malmo is the third largest city in Sweden with 276 000 residents (CIVITAS 2009) located in Skane just 20 km from Lund. Having an international harbour, two airports Kastrup and Sturup, connected with Denmark by the Oresund bridge, it is the centre of fast growth and development. Malmo is now shifting from its industrial specialization to the service provision, enhancing the thriving business environment. The main sectors are logistics, trade, construction and property. Also there are companies working in the field of bio-, medical and environmental technologies. Among the recent developments is opening of Malmo University in 1998 which accommodates nearly 15 000 of students (Malmo Municipality 2009).

The city municipality is actively engaged in the activities to combat the climate change. The city has succeeded to cut the emissions by 9% till 2000, but has the goal of further reduction by 50% until 2050. The traffic is nowadays responsible for 45% of all GHG emissions, and dealing with the transportation issues is thus of the high priority (Climate for Change 2009).

The modal split in Malmo in 2003 is depicted in the Table 5-5 (CIVITAS SMILE 2009a). Over 50% of trips are made by cars, and a great potential exists in increasing biking, walking and use of public transportation.

Table 5-5 modal split in Malmo

Transportation mode	By trips
1. Cars	52%
2. Walking	14%
3. Biking	20%
4. Busses	10%
5. Trains	3%
6. Others	1%

Source: CIVITAS SMILE 2009a

The first measure to manage the mobility needs and ensure environmentally friendly traffic has started in Malmo in 2002 in the Vastra hamn region. This pilot project has been sponsored by the government and has shown the successful results. After that it was decided to expand the mobility management office and undertake further activities to improve transportation system city-wide (pers. comm. Linda Medberg). With this purpose Malmo has joined the CIVITAS SMILE project sponsored by the European Commission (stands for City-Vitality-Sustainability, 'towards Sustainable Mobility for people in urban areas'). Started in 2005 and ended in January 2009, with the overall budget of 34 million EUR, the project was coordinated by the city municipality (Environmental Department and Streets and Parks Department) (pers. comm. Peter Nilsson).

The overall goals of CIVITAS SMILE are (CIVITAS 2009):

- to improve the quality of urban air

- to create sustainable, convenient, intermodal and safe transportation system aiming at improving the life quality of citizens

- to decrease the car ownership and promote environmentally friendly travel alternatives

- to improve industrial transportation aiming at efficient distribution of commercial goods and decrease of negative environmental effects

With the purpose of achieving the set goals, the following measures were implemented in Malmo (CIVITAS 2009)

- Promotion of clean vehicles in the city. Concrete campaigns include: clean municipal fleet, biogas on the net, clean heavy vehicles with $CO2$ coolers, environmentally adopted cars, extended environmentally zones for heavy vehicles, marketing of clean vehicles by subsidized parking, eco-driving

- Promotion of public transportation. This measure is achieved through marketing of new bus route system, bus priority system, improving safety and security on busses and integration of cycling with public transportation systems. Car sharing is also marketed for businesses as well as private persons.

- Managing mobility needs for private persons and business. This measure aims to alter the travel behavior of people through education/information, guidelines and marketing.

- Assisting in freight transportation planning. Concrete activities include: freight driver support through installation of vehicle computers, sustainable SMEs (small and medium size enterprises) logistics for food industry, satellite traffic management for SMEs.

5.2.2 Cycling

The city of Malmo has started to promote cycling as an alternative travel mode since 1996 when the first Bicycle Program was issues. Taking into consideration that almost 90% of residents have their own bicycle at disposal, geographic conditions are suited for cycling and in 2009 bicycle lanes account for 410 km, great potential exists in further increase of bicycle traffic. More comprehensive measures with strong focus on the marketing campaigns to promote cycling were started in 2005 under CIVITAS project sponsored by European Commission and have yielded successful results. Before 2005 the share of bicycles among all journeys made by citizens accounted for 20%, while at the finishing stage of the project in 2008 made up 23% (pers. comm. Peter Nilsson).

5.2.2.1 Problem definition

Previously, all the attempts to encourage cycling were narrowed just to building of supportive infrastructure facilities. This time under the CIVITAS project the problems were defined in frames of making cycling very attractive for citizens. The main set objectives include (Peter Nilsson):

- Improvements in bicycle infrastructure aiming to make cycling safe, convenient and fast alternative.

- Integration of cycling with public transportation to increase the traffic intermodality.

- Active promotion of cycling through information provision, creation of demonstrative lanes and marketing campaigns.

5.2.2.2 Target audience

The main group of users targeted in the project is car drivers in the City of Malmo themselves, as well as those commuting from the neighborhood regions. Motorists are mainly affected by the campaign "No ridiculous car journeys". Besides targeting each motorist on the individual level, the companies are approached to promote cycling activities among their employees. The initiative called "Companies on Bikes" has started in 2007 and nowadays 53 companies are part of it, have already traveled on their bikes more than 18 000 km. (CIVITAS SMILE 2009b).

5.2.2.3 Barriers and benefits

One of the barriers people perceived in switching to bicycle use is associated with safety issues. Before CIVITAS project the dedicated bike lanes have been often run in parallel with the intense road traffic, lightning as not sufficient enough, air pumps were not installed and poor marking of bicycle infrastructure with special signs resulted in confusion of cyclists on the roads. During CIVITAS the substantial improvements in safety of existing infrastructure have been carried out. Posting of signs, better lightning adjusted to local conditions, separation of biking lanes from the traffic with green belts, air pumps along the routes and comfortable poles close to intersections so that bikers can lean on it are all the measures undertaken to improve the image of cycling as a safer alternative (pers. comm. Peter Nilsson).

In addition, bicycle detectors were installed at nearly 26 intersections with intense traffic in the city. The special sensors installed under the bicycle lane recognize the cyclist moving towards the crossroads and change the light signal on the green one. Thus bikers do not have to stop and press the button to change the light signal on green, which lowers the risk of accidents and allows saving time (pers. comm. Peter Nilsson). Due to detectors installation the proportion of bikers forced to stop at the intersections has decreased from 64% to 47%, speeds are increased up to 2km/h, and waiting time has been reduced by 2-7 seconds. However, this measure is quite costly and detectors are still not working during the peak hours (CIVITAS SMILE 2009b).

To remove the barrier associated with incontinence of bicycle use and increase intermodality of city traffic, integration of cycling with public transportation was carried out. It was decided to locate two parking facilities at the Central Station and at Sodervarn nodes where construction of City Railway Tunnel is currently undergoing with plans to finish it in 2011. These facilities have to ensure high level of security and provide additional services like purchasing bicycle helmets, compressed air for tires etc. (this target though has not been completed under the CIVITAS project) (CIVITAS SMILE 2009b). As an additional measure of integrating cycling with public transportation, the web-planner tool is available (Riese Plannier at www. traffiken. nu) to better adjust but schedules with cycling (pers. comm. Peter Nilsson)

The benefits promoted are usually linked to good economy, better health and environment, freedom and flexibility. The messages with stress on such rational information are constantly

disseminated among the public improving the image associated with cycling (pers. com. Peter Nilsson)

5.2.2.4 Exchange options

Cycling is in itself one of the sustainable travel alternatives proposed to citizens along with walking and public transportation. However, the marketing activities are widespread to reach the heterogeneous target audience, not really test offers are presented to residents as in case of Lund where "Health-bikers" campaign is organized (pers. comm. Peter Nilsson).

5.2.2.5 Behavior change tools

Among the behavior change tools utilized is provision of residents with information through different communication strategies. The film has been shown in the public places delivering the idea that most of the journeys made by cars are ridiculously short (less than 5 km), mass media was involved to promote the image of cycling as fashionable and smart, advertisement billboards were installed to remind people about existence of better alternative to car driving (like 'Look! Here is motorist on the bike') (CIVITAS SMILE 2009b).

The creative idea to publish the book about cycling experience of celebrities was picked up and disseminated among 40 000 households as well as civil servants, politicians, different cycling organizations and shops. Personalized invitations and cycling maps were sent together with books to encourage people attending the event "Famous people who bike in Malmo". This measure adds to modeling of behavior change by presenting cycling as a norm already experiences by many celebrities (pers. comm. Peter Nilsson).

To further promote cycling as convenient, safe and fast alternative the subproject of converting the most frequently used bicycle lane into demonstration facilities has been undertaken. Two demonstration lanes with total distance of 4-5 km were created at Univerity Path and Helenoholms Path. Streets and Parks Department together with consultancy were involved in elaborating and implementation of ideas about potential improvements. The aim of the project is to develop concepts and ideas for greater comfort, safety, security and clarity with posting signs/driving directions, weather protection measures, better lighting etc. (pers. com. Peter Nilsson). The main improvements perceived by people on the demonstration lanes were revealed through questionnaires and are shown in Figure 5-3.

The most commonly recognized marketing campaign is those called 'No ridiculous car journeys". Started in 2007 it is constantly repeated to point attention of citizens that many trips made by motorists are ridiculously short, less than 5 kilometres. The campaign received a lot of advertisement in public places. Information sheets were installed throughout the city and teams of bikers along the roads were promoting image of cycling overtaking cars stuck in the traffic jams. The results of phone surveys in 2007 has revealed that up to 50% of people has noticed the campaign while nearly 10% started to think about or even altered their travel habits (CIVITAS SMILE 2009b).
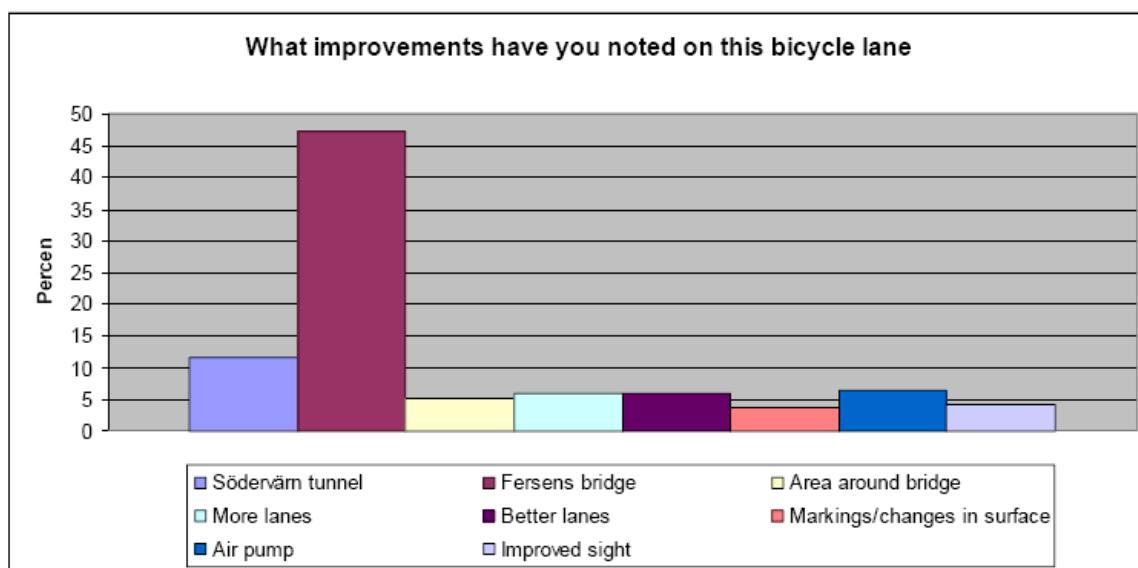
Figure 5-3 improvements perceived by cyclists in Malmo at demonstration lanes.

Source: CIVITAS SMILE 2009b

'Companies on bikes' campaign has also been launched in 2007 where companies who already considered purchasing of bikes for their employees have been provided with the good price offer. Around 120 orange coloured bikes easily noticed in the streets were purchased, including additional equipment like bike computers and logo signs. Large kick-off was arranged to attract the attention of mass media, different companies were personally contacted to attend the event. To further encourage the use of bicycles the competitions between companies are regularly arranged where the winning company cycled the longest distance is awarded with the carrier bike. Bikes ran more than 300 km/year are participated in the additional lotteries (pers. comm. Peter Nilsson).

5.2.2.6 Stakeholder involvement

The individuals and companies are involved in the project planning through regular assessing of their needs and attitudes through travel surveys. The Swedish Road Administration and European Commission within the frame of CIVITAS SMILE project are supporting and sponsoring the bicycle programs. The stuff from city municipality (Streets and Parks Department) and Mobility Office is committed to elaboration and implementation of the program. As the measure of promoting cycling are highly integrated with public transportation measures the Skanetrafiken is also important partner assisting in ensuring safety and convenience on the intersections. Politician's attention is constantly attracted to gain strong political support and commitment to sustainable urban planning (pers. comm. Peter Nilsson).

5.2.2.7 Piloting, monitoring/adjustment, policy redesign

Before implementation of bicycle projects the piloting is an importation pre-step to ensure better planning and adjusting of main strategies to the ground realities. Creation of demonstration lanes and detailed travel surveys about the improvements made are an example of careful piloting before wide scale up-dates in the bicycle infrastructure. Also, Mobility Office responsible for managing travel need has first started with pilots in the Vasterhamn area and only after supervising successful results has been engaged in projects on the city level (pers. comm. Linda Medberg).

5.2.3 Public transportation (bus ridership).

Public transportation system in Malmo before its reconstruction was made up of 20 bus routes and bus ridership accounts for nearly 10% in the modal split. In 2005 the ambitious plan to replace the existing infrastructure with 8 main and 6 supportive lines was developed, aiming to increase convenience, safety and speed of commuting by busses. The new system was planned to be better adjusted to the new residential areas and underground city tunnel currently in the process of construction. The overarching goal was to increase the number of passengers by 10 percent in the end of 2006 and by 30 percent in the end of 2010. Till now the quantitative target set for the year 2010 is not fully achieved (>50% is completed), but constant increase in number of bus commuters is taking place as depicted in Figure 5-4 (CIVITAS SMILE 2009a).
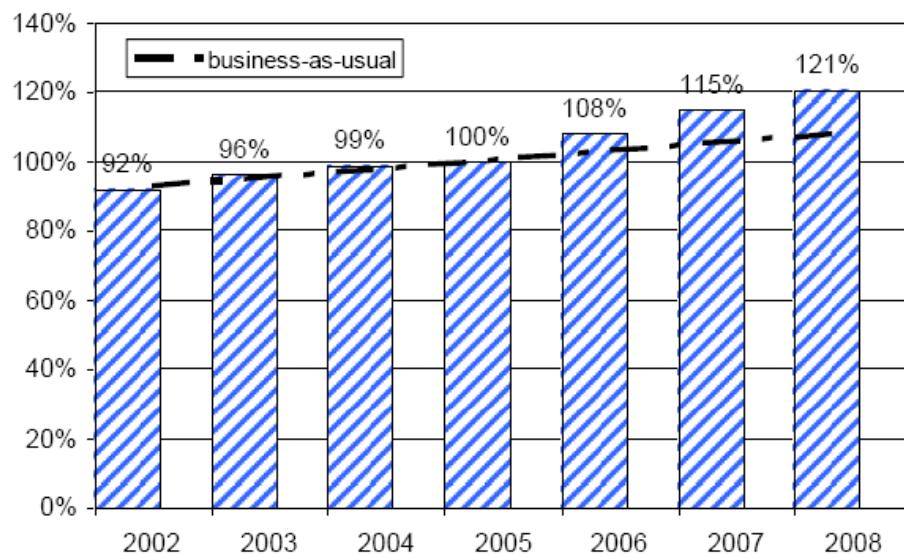

Figure 5-4 increase in the number of bus commuters on the yearly basis in Malmo (business-as- usual is based on the trends existing before CIVITAS SMILE project)

Source: CIVITAS SMILE 2009a

5.2.3.1 Problem definition

To increase the share of passengers commuting by bus, it is important to make qualitative improvements in the public transportation infrastructure is realized to encourage people to alter their travel behaviour. The main targets set are (CIVITAS SMILE 2009a, CIVITAS 2009):

- Update bus infrastructure and replace it with fewer bus lines so that travellers have to make as little bus changes as possible while reaching the required destinations. This allows for better convenience and easiness of commuting by bus

- Increase safety and security of bus routes

- Bus priority system

- Information provision to let people now about the changes and marketing campaigns to encourage bus ridership among citizens

5.2.3.2 Target audience

The targeted audience were regular commuters, as well as non-commuters. Leaflets with information about planned changes were disseminated to the customer service centers at Skanetraffiken and workplaces in Malmo. Three weeks before the changes were introduced (May 25th, 2005) detailed materials about new measures were sent to all city residents. Brochures were area-specific, issued in 13 editions with information better adjusted to people living in different areas of Malmo. Besides personal targeting of individuals, impersonal methods were applied as well. The ambassador group was created (educated bus operators, representatives from city municipality and Skanetraffiken office) and sent to different public events and meeting to let people know about expected reconstruction of the bus route system (CIVITAS SMILE 2009a).

5.2.3.3 Barriers and benefits

One of the barriers associated with bus commuting was safety issue. The travel survey has shown that 38% of respondents have experienced fears of riding the busses due to threatening behavior such as vandalism and robberies. To remove such barrier, the security cameras were installed in 170 busses with nearly 4 cameras per bus. This measure makes both drivers and travelers feel much more protected, increasing the image of public transportation. After the measure was implemented, 17% of respondents claimed that they started to commute by busses more (CIVITAS SMILE 2009a).

When using the public transportation system, people are also aware about potential time delays in their bus journeys. In order to ensure that bus ridership is a faster traveling alternative, it was decided to make main bus lines as quick as possible. During peak hours busses arrive every 5-6 min so that people do not have to care about time-tables. The slogans were written on the busses "Now it will be hard to miss the bus". Such improvements resulted in 20% increase of travelers in period of first five months after measure implementation. Also, the bus priority system was updated further contributing to time savings during the journeys as well as increasing safety on the roads (CIVITAS SMILE 2009a).

The whole concept of updating the bus route system aims to make the number of bus routes per person in Malmo among the lowest in Europe, ensuring bus scheme is simple to understand and use. Thus one of potential barriers associated with complexity and inconvenience of using the busses is overcome.

Among the benefits offered are cheaper, faster and more environmentally friendly alternative. Three main words were chosen by Skanetrafiken to promote the benefits of new bus system that are greener, easier and often. Greener because Malmo busses are running on methane that resulted in less pollution compared to diesel, easier due to fewer lines and often due to high bus frequency in the peak hours (CIVITAS SMILE 2009a).

5.2.3.4 Exchange options

New bus routes are already attractive an alternative to car driving due to undertaken reconstruction in the system that makes it cheaper, easier, faster and more sustainable option. However, test offering of free trials to experience the benefits of new public transportation system as in case of "Test riders" in Lund were not included in the marketing strategy due to high financial expenses associated with the measure (CIVITAS SMILE 2009a).

5.2.3.5 Behaviour change tools

As it was already mentioned in section 6.2.3.2 personal communication and impersonal communication campaigns were organized when information about new bus routes was send either individually by mail or disseminated through the ambassador group participating in public events and meetings. Provided materials include brochure about new routes, question and answer folder, information about nearest bust stops. Advertisement was made in newspapers and on busses. Location of big signs at the outskirts of the city to remind travelers about existence of improved alternative was however considered too expensive and time demanding due to necessity of obtaining building permits and thus has been not implemented. On the same date as the changes in the city were implemented (June 12th, 2005), Skanetraffiken has organized open lunch for public on the main city square with invited celebrities, encouraged different competitions and made little presents to the winners. All these measures resulted in the high level of awareness about implemented changes among frequent commuters in Malmo (figure 5-5). In 2006 to follow up promotion of bus routes, additional individualized marketing campaigns were held assisting each household with how to travel with busses (CIVITAS SMILE 2009a, pers. comm. Linda Medberg).
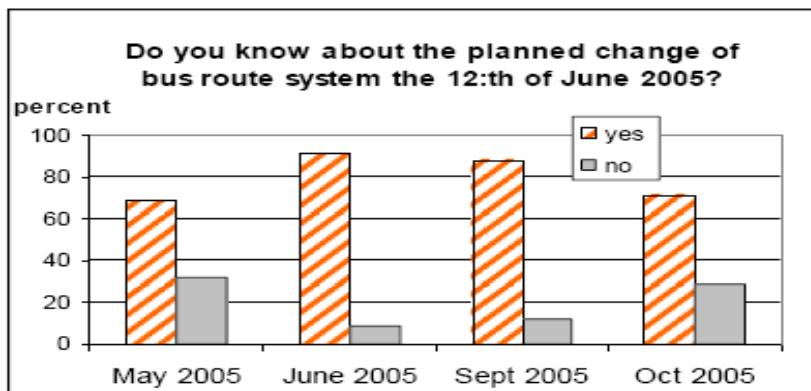

Figure 5-5 level of awareness among frequent commuters in Malmo about the changes in the bus route system

Source: CIVITAS SMILE 2009a

5.2.3.6 Stakeholder involvement

Among the stakeholders involved is regional transportation authority is Skanetraffiken. As organization is run by governmental servants there is a high level of awareness and commitment to ensure sustainable alternative to car driving. Different departments at city municipality are involved in elaboration of different measures together with Skanetraffiken and establishment of strong public relations strategies. ID Communication is consultancy company assisting in organization of different marketing and communication campaigns. Bus operators companies as Veolia Transport and Arriva are also involved in activities associated with planning and promotion of bus ridership. Also, strong emphasis is put on taking into consideration needs and attitudes of people commuting within Malmo as well as to and from the city (CIVITAS SMILE 2009a, pers. comm. Linda Medberg).

5.2.3.7 Piloting, monitoring/adjustment, policy redesign

There were introduced no piloting as such before the wide scale changes in bus infrastructure system in Malmo. When the major improvements have been made, there appeared to be people who felt transportationally disadvantaged as result of applied measures. With the

purpose to readjust the system to fulfill their needs the ambassador group was sent to different areas in the city were complaints from citizens were received. After receiving the feedback, certain changes where made in the bus routes to meet requirements of disadvantaged groups of population. It should be noticed, that due to bus system renovation mainly commuters on the outskirts of the city perceived changes as negative (CIVITAS SMILE 2009a).

Travel surveys are conducted on the regular basis to monitor conditions of bus infrastructure and take into conditions requirements of frequent travelers. Thus process of constant adjustment of public transportation strategies is taken place to ensure attractive travel alternative for citizens of Malmo (pers. comm. Linda Medberg).

5.2.4 Car sharing

Before 2006 in the city of Malmo there was only one private car pooling organization which owns two cars powered in conventional way. The decision to establish the commercial alternative to individual car ownership was undertaken by Sunfleet run by Hertz and Volvo companies. This measure was innovative also due idea of owning only 'green' cars enabling better environment in the urban area. Nowadays most of the cars have potential to use only clean types of fuels. Still, there are vehicles operating on petrol (like Toyota Aygo) though fuel consumption rates for them are low. Currently there are 5 car sharing stations located in the central part of the city with total of 15 cars available for different types of customers. The number of clients is constantly increasing, with 112 individuals and 111 company users recorded in April 2008 (CIVITAS SMILE 2009c).

5.2.4.1 Problem definition

The problem was defined in the way to make people accept the new concept of car owning and contribute to modal split towards more environmentally friendly alternative. The main set objectives include (CIVITAS SMILE 2009c):

- Improved environmental performance contributing to better air quality in the city. From the very beginning it was planned that 50 percent of utilized fuels will be 'clean' in 24 months period after measure implementation.

- Improved safety due to high level standard vehicles

- Social equity in vehicle usage (different models and sizes of cars should be available at car sharing sites to better meet demand of diverse type of users)

- Provision of information and marketing methods to raise the level of awareness and acceptance among the public

5.2.4.2 Target audience

Throughout the whole project different types of users were targeted to alter their behavior: general public, business entities as well as other organizations including governmental one. Originally there were an intention to differentiate between car sharing sites for different user groups to better investigate their needs and behavioral responses towards new transportation option. However, it is appeared both economically and practically to open the mixed car pools. For instance, business partners and individuals use cars in different periods of time (companies mainly in working hours) what allows increasing the utilization efficiency and availability of cars (CIVITAS SMILE 2009c).

5.2.4.3 Barriers and benefits

During project implementation it was revealed that Malmo citizens appeared to be resistant to change their behavior to alternative travel mode as car sharing. The main barriers for it has not been revealed due to low level of response on surveys conducted (CIVITAS SMILE 2009c).

Among the benefits offered to promote car sharing schemes are money savings, environmental benefits, convenience as people do not have to bother about car maintenance, insurance, parking fees etc. For companies one of the drivers of joining car sharing schemes is improved corporate image. Main reasons why people became the members to Sunfleet are represented in the diagram below (Figure 5-6).
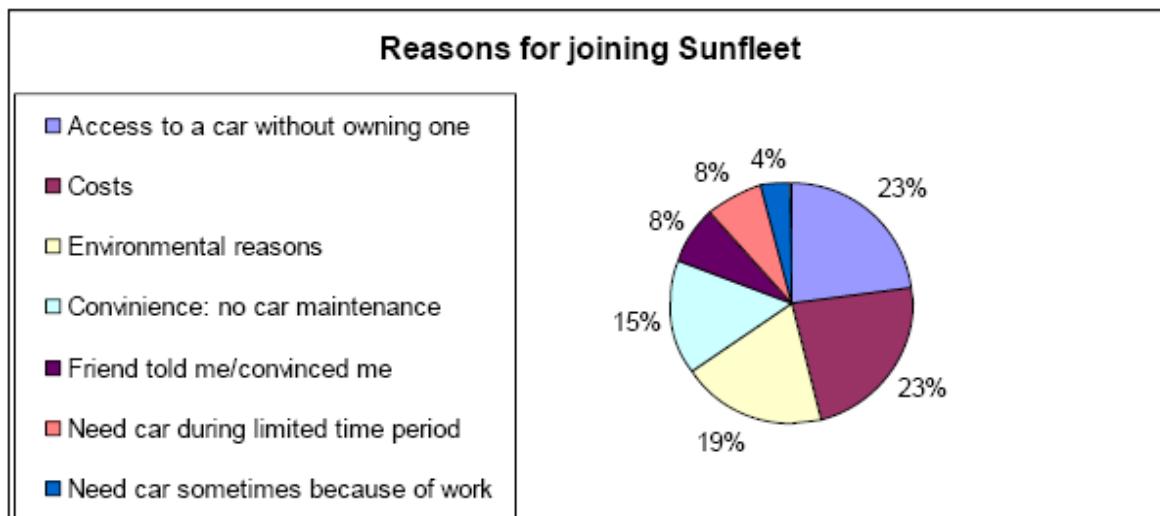

Figure 5-6 reasons for becoming a member to Sunfleet car sharing scheme

Source: CIVITAS SMILE 2009c

5.2.4.4 Exchange options

Car sharing scheme is the new option of having access to the individual vehicle without owning one and additionally contribute to promotion of other alternatives such as walking, cycling and public transportation. Though benefits of becoming a member to Sunfleet in Malmo are promoted among people, test offers first to try and experience new behavior before ultimate adoption of new alternative are not elaborated (CIVITAS SMILE 2009c).

5.2.4.5 Behavior change tools

Information about car sharing was disseminated through different channels: on public events, in newspapers, through organizational networks. Also, direct marketing were conducted when information about car sharing schemes was disseminated personally through e-mails. Though, due to technical mistakes this individualized campaign has failed reaching too little individuals (CIVITAS SMILE 2009c).

As result of undertaken communication measures, level of awareness among the respondents has increased from 28% to 47% in period from 2003 to 2008. Still, the share of people participated in the survey who does not know anything about car sharing has also increased from 33% to 35% in the same period, indicating that further communication with potential

clients is required to raise the level of awareness among general public and companies (CIVITAS SMILE 2009c).

Location of car sharing stations in the very center, especially near Malmo central station, improves access, convenience and intermodality what can serve as incentives for people to switch to new alternative than owe an individual vehicle. Construction of car pooling sites in the vicinity to companies is considered to facilitate behavior change among the employees, though not implemented yet (CIVITAS SMILE 2009c).

5.2.4.6 Stakeholder involvement

Users of car-sharing schemes are active stakeholders in the process of coming up and implementing new ideas to improve services provided. Malmo University has assisted the project by elaborating on evaluation indicators and further evaluation analysis. HM Skane which is sustainable mobility office in the region of Skane has shown the great support to the initiative, contributing to promotion of car sharing alternative among people. Partnership with Skanetrafiken has taken place when it was decided to built one of car sharing sites at the Malmo central station. This adds to increased intermodality and therefore convenience for customers. Among other stakeholders involved are different private companies providing associated services like technical support and cleaning of vehicles, advertising and marketing organizations (CIVITAS SMILE 2009c).

5.2.4.7 Piloting, monitoring/adjustment, policy redesign

Car sharing in Malmo is great achievement taking into consideration that no commercial alternative was existing prior CIVITAS SMILE in 2005. Still, the project is on the piloting stage where nearly 200 customers, both private and business, are involved into active usage of new travel mode (CIVITAS SMILE 2009c).

Evaluations about activities and success of car sharing scheme in Malmo are available from 2006. Individuals and corporate users are constantly surveyed by the Sunfleet managers and employees through travel diaries to assess awareness and acceptance level, attitude change as well as real changes in travel behavior. In 2008 General Travel Survey as part of technical evaluation in the city of Malmo was carried out where around 3000 respondents where asked about their travel habits with nearly 1800 responses received (CIVITAS SMILE 2009c). All of this contributes to better understanding of customer preferences and adjustment of strategies to meet their needs.

Till now, the modal shift towards car sharing option has not been revealed. The reasons for it are small size of population surveyed, low level of response rate on the questionnaires especially among business clients who prefer to keep the information closed and that customers to Sunfleet in Malmo are mainly those who did not owe the private vehicle before establishing car sharing scheme (CIVITAS SMILE 2009c).

5.2.5 Changes in travel behaviour in Malmo

Statistics available to judge about changes in travel behaviour in Malmo are those depicting the modal split before and after CIVITAS SMILE project represented in Figure 5-7 and Figure 5-8 correspondingly. The diagrams are built according to nearly 5000 travel diaries filled in by respondents of different age groups between 18 and 75 years old in Malmo. Respondents pointed out the travel option they use for each journey during a day.

In general, measures undertaken during CIVITAS SMILE have successfully altered the travel behaviour of citizens in Malmo. As it can be seen, car usage has decreased from 52% to 41% while walking and cycling has increased. Bus ridership has not experienced any positive changes, though the total amount of passengers has increased according to Figure 5-4. This can be explained due to the reason that total number of citizens has increased for the associated time period by 6% and thus positive changes in bus ridership has not been depicted in the modal split. Also, number of passengers has increased due to the regional commuters which have not been represented enough in the population sample surveyed (CIVITAS SMILE 2009a).
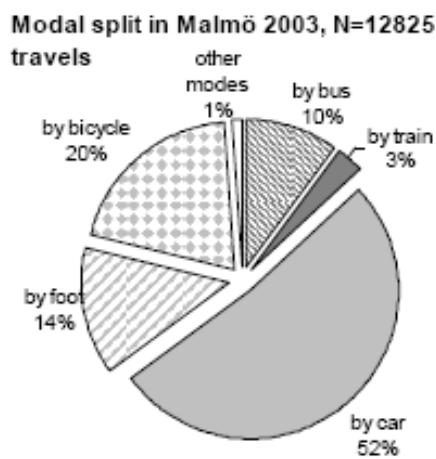

Figure 5-7 modal split in Malmo in 2003

Source: CIVITAS SMILE 2009a
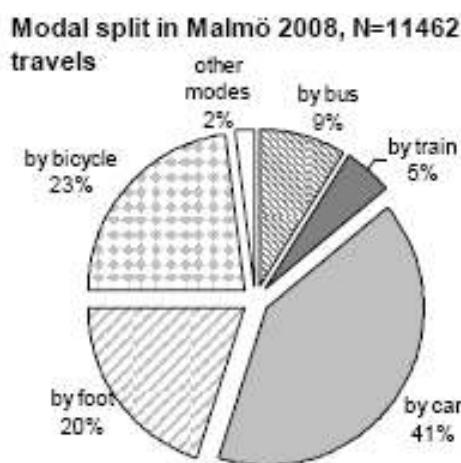
Figure 5-8 modal split in Malmo in 2008

Source: CIVITAS SMILE 2009a

6. Analysis

Current chapter analyses the contribution of social marketing to traditional process of transportation planning based on the investigated cases of Lund and Malmo where the new approach has been recently implemented. Description of cases according to analytical framework in chapter 5 allows detecting social marketing elements that are accounted for in practice and appear to be success factors in the policy planning. At the same time, revealing social marketing elements that are missing in the current policy practices makes it possible to identify areas for potential improvements.

6.1 Policy planning process within context of social marketing in Lund and Malmo

The summary of measures undertaken by Lund and Malmo to deal with transportation issues is presented in Table 6-1 and Table 6-2 respectively. In general, high level of similarity between the cases is revealed. Mainly all steps of proposed policy-planning process within the context of social marketing are taken into consideration by the policy planners of both cities, with the few exceptions for certain activities. For example, there is no differentiation between target audience and no offering of exchange options for car sharing in Lund, while there is no identification of barriers for car sharing and no piloting for bus ridership in Malmo. There is also no offering of exchange options for all alternatives in Malmo. The main steps of the policy planning process in the context of social marketing in Lund and Malmö are analysed below.

1. Problem definition with strong orientation on customer needs and preferences

During the problem definition step for cycling, bus ridership and car sharing, strong emphasis is given to making these alternatives more attractive to customers through improving qualitative characteristics of the associated infrastructure such as convenience, safety, security, speed, accessibility, affordability and environmental sustainability. As result of problem definition with strong consideration of customer orientation component, success of the policy is measured by changes in travel behaviour and perception of new alternatives.

Main differences in problem definition area between Lund and Malmo exist regarding bus ridership promotion. While Lund municipality emphasizes extending bus infrastructure to improve accessibility to different destinations, Malmo municipality has recently decreased the number of bus routes aiming to ensure that the amount of bus lines per capita is among the lowest in the Europe. This measure believed to be more convenient for users as bus schemes become easier to understand and use with fewer changes of busses required to reach different destinations.

2. Application of market segmentation techniques throughout entire process of transportation planning

Differentiation between various groups of users is a fully innovative element, which has been not considered in traditional transportation planning before. Market segmentation allows better understanding and fulfilling demands of potential clients rising level of policy acceptance among the public. In cases of Lund and Malmo regarding almost all offered alternatives there is a strong tendency of approaching both individuals and companies in attempt to alter their travel behaviour. Targeting employees at companies appears to be a very successful measure as it further contributes to spreading new ideas through peer-to-peer communication and perception of marketing behaviour as a normative one.

Table 6-1 Policy-planning within the context of social marketing in Lund

Steps in the policy planning process	Cycling	Bus ridership	Car sharing
Problem definition	-Safe, convenient and accessible infrastructure	-accessible, fast and convenient bus system	-reduction in car driving -ensuring access to private vehicle when required
Target audience	-Existing bikers -car drivers -companies	-car drivers -companies -retired people -disabled people	No differentiation
Barriers and benefits	*Barriers:* -Safety -Security -Inconvenience associated with necessity to change travel mode during the trip *Benefits:* -good economy -time savings -health improvements	*Barriers:* -Time delays -Accessibility -Inconvenience associated with necessity to change travel mode during the trip *Benefits:* -good economy -time savings -freedom and independence -better environment	*Barriers:* -Feeling of impersonality *Benefits:* -good economy -convenience -better environment
Exchange options	-'Health-bikers' -'Bike to work'	'Test riders'	No offers
Behaviour change tool	-Individualized communication -Impersonal communication -Norms -Reminders -Incentives	-Individualized communication -Impersonal communication -Incentives	-Individualized communication -Incentives
Stakeholder involvement	-Politicians -City municipality -Companies -Individuals -Trivector consultancy	-Skanetraffiken (regional bus authority) -City municipality -Companies -Individuals -Trivector consultancy	-Lund Energy -Housing company -Private companies -Individuals
Piloting, monitoring/adjustment, policy redesign	-Piloting is important pre-step -Constant monitoring and adjustment of strategies	-Piloting is important pre-step -Constant monitoring and adjustment of strategies	-Still pilot phase -Constant monitoring and adjustment of strategies

Table 6-2 policy planning within the context of social marketing in Malmo

Steps in the policy planning process	Cycling	Bus ridership	Car sharing
Problem definition	-Safe, convenient and accessible infrastructure	-easy to use, safe, fast and convenient bus system	-reduction in car driving -ensuring access to private vehicle when required
Target audience	-existing bikers -car drivers -companies	-car drivers -regular commuters	-individuals -companies
Barriers and benefits	*Barriers:* -Safety -Time delays -Inconvenience associated with necessity to change travel mode during the trip *Benefits:* -good economy -time savings -health improvements -freedom	*Barriers:* -Safety -Time delays -Difficult in use (too many lines) *Benefits:* -good economy -time savings -better environment	*Barriers:* Not defined *Benefits:* -good economy -convenience -better environment
Exchange options	No offers	No offers	No offers
Behaviour change tool	-Individualized communication -Impersonal communication -Norms -Reminders -Incentives	-Individualized communication -Impersonal communication	-Individualized communication -Impersonal communication
Stakeholder involvement	-City municipality -Skanetraffiken (regional bus authority) -City municipality -Companies -Individuals	-Skanetraffiken (regional bus authority) -City municipality -ID Kommunikation consultancy - Bus operators (Veolia Transport and Arriva) -Individuals	-HM Skane (regional mobility office) -Skanetraffiken -Malmo University (evaluation analysis) -Companies -Individuals
Piloting, monitoring/adjustment, policy redesign	-Piloting is important pre-step -Constant monitoring and adjustment of strategies	-No piloting -Constant monitoring and adjustment of strategies	-Still pilot phase -Constant monitoring and adjustment of strategies

In case of bus ridership promotion in Lund and Malmo, further differentiation between individuals is applied. For example, in Lund, retired and disabled are included in the targeted audience to better meet their mobility needs. In Malmo, information provision about new bus route system is varying in accordance with different districts of the city where inhabitants live.

Only in case of car sharing in Lund no differentiation between various user groups has been identified. One reason to it is the non-commercial form of car sharing scheme in Lund's Bilpool organization, which is one of the service providers. Organizational board is simply not interested in marketing their activities; therefore there is no essential need to distinguish between preferences of different clients. However, commercial alternative of car-sharing has also become recently available in Lund through Sunfleet company where some attempts are made to account for needs of different clients mainly on individual and company level.

From the analysed case studies it becomes obvious that market segmentation is not conducted in advance as a separate step before other planning activities, rather it is an important component that has to be incorporated into the entire process. Obviously, various groups of users perceive problems in different ways, are concerned with different barriers and benefits, and therefore require different types of communication strategies and promotion campaigns.

3. Barriers and benefits identification for formulation of attractive travel options

Both in Lund and Malmo, identification of barriers and benefits for customers is an important step of the social marketing approach in transportation policy planning. Careful consideration of barriers and benefits allows elaboration on alternatives which better suit customer needs contributing to voluntary behaviour change, when people are not forced but voluntarily interested to be engaged in the new forms of behaviour.

With regard to cycling, most common fears perceived by people are those associated with safety issues. In order to remove this barrier, both in Lund and Malmo technical improvements of bicycle infrastructure is undertaken, including separation of dedicated lanes from road traffic by green belts, better illumination, bump controls on the road intersections, air pumps installation etc. In comparison to Lund, Malmo has gone further in ensuring safety of cycling by installing bike detectors on intense traffic intersections which recognize bike on the road and change light signal on green one in advance. However, detectors are working only during non-rush hours granting road priority to the cyclists. In addition to safety issues, Lund citizens are concerned about the possibility of bicycles thefts, so in order to mitigate this risk guarded parking services for bikes are established throughout the city.

To deal with perceived inconvenience when change of travel mode is required during the trip, integration of cycling with public transportation both in Lund and Malmo is carried out through location of bike parking facilities close to bus stops. This allows increasing intermodality of city traffic. However, the same kind of integration has not been done with car sharing.

In promoting bus ridership both in Lund and Malmo, customers are mainly concerned with accessibility issues and time delays. To remove these barriers well-elaborated bus route system with high level of access to most commonly required destinations together with high bus frequency is offered, as well as bus priority on the roads is established.

With regard to non-commercial car sharing scheme in Lund, the main identified barrier is feeling of impersonality in owning the car. Keeping a ratio of one car for twenty users in Lund's Bilpool allows creating a kind of family atmosphere mitigating the feeling of

impersonality. Only in case of commercial car sharing in Lund and Malmo barriers to new behaviour has not been revealed mainly due to low level of response on questionnaires among the respondents.

The main promoted benefits of cycling, bus ridership and car sharing are those associated with good economy, time savings, better health and the environment.

4. Exchange options formulation to provide people with several alternatives of behaviour change

Formulation of exchange options is an innovative component for traditional transportation planning approach. In case of Lund and Malmo in order to make people to give up car driving several well-elaborated alternatives are provided such as cycling, public transportation (mainly bus ridership within the city area) and car sharing that allows access to private vehicle in case of necessity without owning one. Variety of convenient and attractive alternatives provide people with a number of options to change their behaviour so they can decide themselves which one to choose. Additionally, improved alternatives of cycling, public transportation and car sharing affect social equity issues in a positive way, benefiting people who are previously appeared to be disadvantaged in their transportation possibilities.

5. Provision of test offers to let people first experience new alternatives

In case of Lund, test offers were provided to regular motorists for such alternatives as cycling and public transportation ('Health-bikers' and 'Test-riders'), so that they first were able to try and experience the new behaviour before ultimately switching to new travel mode. In practice, such measures appeared to be very successful: over 50% of residents that participated in test offers eventually have switched from car driving towards a more sustainable travel mode. Test offers recognize the necessity of first changing the behaviour rather than changing attitudes in the first place. Once people have the opportunity to experience advantages of the new behaviour, their attitudes are then much easier changed towards more sustainable alternative.

In case of all alternatives in Malmo and car-sharing in Lund, no test-offers are developed mainly due to budget constraints as such type of measures require substantial investments. In addition, non-commercial basis of Lund's Bilpool car sharing club results in lack of incentives to market their activities through elaboration of test-offers.

6. Behaviour change tools to promote sustainable travel modes (door-to-door communication campaigns, provision of incentives as well as utilization of prompts and norms).

Utilization of behaviour change tools is an important component of public policy planning within the context of social marketing approach. These tools include informative instruments, though not only narrowed to impersonal methods of information provision through mass media channels and public events. An important component of promotion of new alternatives both in Lund and Malmo include door-to-door communication where customers personally receive comprehensive information about benefits of cycling, public transportation and car sharing, and are educated on how to use new travel options. Such kind of individualized marketing campaigns appeared to be very effective way to target people to make them consider changes in travel behaviour. For instance, in Lund, people are presented with the smart transportation concept where benefits of sustainable alternatives are highlighted and detailed explanation about use of new traffic modes is given, including information on nearest bus stops, cycling facilities, buss pass discounts, timetables etc. In Malmo, wide scale individualized campaigns were conducted before updating the bus route system where all city residents have received personal correspondence about planned changes and information about system

operation, including questions and answers folders, timetables, brochures on new bus routes etc.

In promotion of cycling both in Lund and Malmo wide variety of behaviour change tools is utilized which to a certain extent contributes to high level of success. Besides impersonal and individualized communication also norms (demonstration bikes, teams of bikers in orange clothes or on orange bikes on the roads, book edition about cycling experience of celebrities), prompts (visual reminders as posters) and incentives (location of bicycle parking facilities in proximity to work places and bus stops, counting of cycling time to work as work hours, arrangement of cycling competitions among companies, building of shower and changing rooms at work places) are applied.

In case of car sharing promotion, both in Lund and Malmo behaviour change tools are limited to information provision through impersonal and individualized communication campaigns which however are quite few and launched on a small scale.

7. Stakeholder involvement in all steps of policy planning process

Establishing relationships with important stakeholders is an innovative element in traditional policy planning process. Both in Lund and Malmo, inclusion of individuals household and company levels into decision-making throughout entire process of transportation planning process allows keeping strong emphasis on the customer orientation component.

Strong support from city municipality, interrelation between different city departments, integration of public transportation with cycling measures to increase intermodality, collaboration with regional bus authority Skanetraffiken and Mobility Offices allows reaching high levels of synergy between measures aimed to alter behaviour among city residents both in Lund and Malmo.

It should also be noticed that among distinctive success factors in Lund is the strong support of politicians from all parties and incorporation of sustainable traffic issues in the Lund Master Plan which furthers integration of transportation issues with city planning and construction activities.

8. Piloting as important pre-step to policy implementation

Piloting is an important pre-step of policy implementation, which is usually not considered in a traditional transportation planning process. In case of Lund and Malmo pilot with a small sample of community is conducted in regard to elaboration on all transportation alternatives, with exception to bus ridership infrastructure changes in Malmo. Only after successful results of piloting are revealed and behavioural response on the measures is studied, wide scale policy implementation is started.

6.2 Comparison of social marketing approach versus traditional transportation planning

As it has been revealed in description and comparative analysis of cases (chapter 5 and section 6.1), eight innovative elements to traditional policy planning are applied in the social marketing approach in Lund and Malmo. They are problem definition within strong orientation on customer preferences, differentiation between needs of target audience, identification of barriers and benefits customers concerned with, formulation of several exchange options (sustainable travel alternatives), provision of test offers, utilization of behaviour change tools,

stakeholder involvement and piloting before wide scale policy implementation. This section seeks to analyse how application of social marketing approach may close existing gaps in the traditional process of transportation planning that is based on the rational behaviour model. In this way, this section answers the research question about how social marketing contributes to success of existing policy packages.

Careful consideration of complex psychological process assisting people in making their travel choices. In case of application of the traditional approach to dealing with transportation issues, complex psychological processes assisting people in making their choices are not considered. Social marketing on the other hand recognizes that problems do not exist in isolation from the human mind. As it has been revealed during the case studies in Lund and Malmo, people resistant to switching to more sustainable travel modes as they have strong images of cycling and public transportation as unsafe, insecure, inconvenient in terms of accessibility to different destinations alternative. In order to change their travel habits both in Lund and Malmo the emphasis in problem definition is switched from setting quantitative targets of traffic reduction to qualitative improvements in associated infrastructure. Regular use of travel surveys allows planners to define problems based on customer attitudes, benefits and barriers they are concerned with. Furthermore, success of the policy is not strictly measured in how quantitative objectives are met, rather in changes in travel behaviour and perception of new alternatives.

Provision of several alternatives to problem solving with regard to different user groups. As traditional transportation planning is built on the rational behaviour model, one way of problem solving believed to be the most effective and efficient is picked up by policy planners. Of course, combination of different economic instruments (road pricing, parking fees), technical measures (environmentally friendly cars, road infrastructure extension) and regulations (car free zones) is considered to achieve the set targets best, but they are all applied to the whole group of people without further differentiation between various user segments, which creates consequences for social inequity. As a result, people who are living far away from infrastructure facilities will not be able to switch to public transportation or cycling and will have to continue driving cars even if they do not want to. People with high level of income will continue to drive because perceived benefits of driving outweigh associated costs. Disabled groups of population do have to rely on private vehicles as they lack required services in public transportation system etc. In social marketing approach the emphasis is shifted from application of 'unwanted' policy tools to the development of several convenient alternatives like cycling, public transportation and car sharing providing people with several solutions to the problem. Travel alternatives are better adapted to the needs of various user groups to fulfil their demands which positively address social equity issues. For instance, employees in Lund and Malmo are provided with convenient public transportation and cycling infrastructure at business areas, retired people in Lund who require high level of access to housing areas are offered a special grey bus system and access for disabled people to public transportation system in Lund is also improved.

Facilitation of voluntary behaviour change. Provision of several alternatives to individual car driving, utilization of behaviour change tools that are supplemented with insights of behaviour change theory, careful consideration of barriers and benefits contribute to traditional policy planning by facilitating voluntary behaviour change rather than forced one through application of road pricing and traffic ban measures. Voluntary behaviour change takes into consideration important predictor of behaviour change accounted for in the theory of Reasoned and Planned Actions (Aizen 1991) that is locus of control over situation. Providing people with opportunity to independently decide when, where and how to travel in a more environmentally friendly manner leads to sustainable and long-term behaviour change rising success of transportation policies.

Provision of comparative advantages of new behaviour that makes people to be self-interested in behaviour change. In Lund and Malmo careful consideration of barriers and benefits for people allows coming up with alternatives that posses comparative advantage over car driving. These are cheaper, faster, safer, more convenient, healthier, independent and fashionable ways of commuting. Formulating comparative advantage of a new behavior is an important behavior change factor accounted in Diffusion of Innovation Theory that contributes to traditional transportation planning by increasing policy acceptance and public engagement.

Risk and uncertainty mitigations associated with new behaviour. Risk mitigation associated with new behaviour becomes possible in social marketing compared to traditional policy planning through provision of test offers to most resistant motorists. In Lund and Malmo 'Health-bikers' and 'Test-riders' campaigns were launched where car drivers were provided with free bus passes and cycling equipment first to experience new option. Thus trialability of promoted alternatives is provided in social marketing approach that is also considered to be an important behaviour change factor revealed in Diffusion of Innovation Theory.

High level of synergy through stakeholder involvement. In traditional transportation planning decision-making is made by external specialists. On the other hand, in social marketing involvement of customers and different organizations at all stages of policy planning allows coming up with mutually beneficial decisions, improved efficiency in measure's implementation and psychological loyalty, which is especially relevant when benefits of new behaviour are not tangible and are not received immediately. In case of Lund and Malmo all four dimensions of partnership proposed in the multi-relational model of social marketing are accounted for (Hastings 2003a). Supplier partnership is fulfilled by cooperation with Skanetraffiken office that is regional bus services provider, bus operator companies, Lundahoj organization responsible for provision of bikes and associated services, and car sharing companies like Lund's Bilpool and Sunfleet. Buyer partnership is established through constant dialogue with customers regarding decision-making at all stages of policy planning, while lateral partnership is implemented through support by government, municipality as well as collaboration with construction businesses and housing companies. Internal partnership is taken into account through close cooperation between city departments and integration of measures associated with promotion of cycling, bus ridership and car sharing.

Careful consideration of behaviour response through piloting. In traditional transportation planning adjustment to the strategies is made on the basis of already implemented solutions. On the other hand, social marketing considers piloting as an important pre-step to policy implementation where behaviour responses are carefully considered allowing one more time to assess needs and preferences of potential clients and reveal barriers on the way of engagement in promoted behaviour. In Lund and Malmo transportation solutions are undertaken in a step by step manner starting from small scope projects. For instance, car sharing in both cities is still at the initial stage with careful investigation of potential markets and refining strategies to perfectly meet customer needs. Only in case of bus ridership in Malmo, substantial changes were made in infrastructure system without piloting, although a lot of advertisement and communication activities were undertaken prior to the change.

Going beyond traditional promotion activities. In traditional transportation planning promotion of activities is usually limited by impersonal information provision, while in social marketing door-to-door communication campaigns are carried out to personally address each individual. 'Word of mouth' appeared to be very effective behaviour change tool. Lund municipality considers it as important factor of success, constantly approaching residents with information about smart transportation concept in the city. Besides carrying out individualized marketing campaigns, modelling of new behaviour through 'norms' is applied both in Lund and Malmo

in promotion of cycling, where demonstrative teams of bikers can be seen on the roads overtaking cars stuck in the traffic jams, books about cycling experience of celebrities are edited, campaigns "Look, here is motorist on the bike" are conducted. Application of norms together with individualized marketing campaigns where people are educated about how to use new alternatives account for important behaviour change factors revealed in the social learning theory.

To conclude on contribution of social marketing to the field of sustainable transportation policies, it should be said that it does not leave out the utilization of traditional policy tools as technical, economic, regulatory and informative measures, rather provides new perspective of looking on the arrangements required through the lenses of strong customer orientation at all stages of decision making. Social marketing represents much more holistic, flexible and iterative process of public policy planning compared to traditional one.

6.3 Implications for further development of social marketing

Contribution of social marketing approach might be further enhanced through better consideration of behavior change factors outlined in associated theories from section 3.2 that have not yet been thoroughly addressed by policy planners neither in Lund and Malmo.

According to the theory of reasoned and planned actions, personal attitudes should be accounted in formulation of attractive alternatives. As it can be seen from cases of Lund and Malmo, these attitudes are mainly limited to perception of services provided as safer, faster, easier, cheaper etc. ways of commuting. Obviously, more careful identification and consideration of other personal attitudes that influence car affinity like possibility to conduct business and leisure activities, feeling of fun and privacy will further contribute to success of transportation policy planning. By better consideration of psychological process assisting people in making their choices a more successful transportation system can be devised.

Additionally, the theory of reasoned and planned actions considers perceived behavior control as one of the important predictors of behavior change. In case of Lund and Malmo provision of several alternatives like cycling, bus ridership and car sharing already empowers people to act according to their own preferences ensure high level of control over situation. However, perceived behavior control also implies strong individual belief that one's action brings substantial improvements to the overall transportation situation. Emphasizing this factor while targeting people during individualized communication, might to a certain extent further contribute to facilitation of behavior change and increasing success of promotion campaigns.

As it was noticed in diffusion of innovation theories, it is worth to divide customers in the user segments with regard to their readiness to adopt the change: innovators, early adopters, early majority, late majority and laggards. Obviously, treating car drivers as heterogeneous group that include these user segments may facilitate better allocation of resources. Obviously, laggards that are more resistant to change will require more efforts, time and investment than innovators and early adopters who are already passionate and liberal towards the changes. Such differentiation between target audience will further contribute to the policy planning by facilitation of efficiency saving.

7. Discussion

Current chapter discusses strong and weak points of social marketing approach in transportation policy planning, which might be of value for consideration in case of its application. Also, discussion of the employed in the current study research methods that might affect the results of the study is presented.

As it has been revealed during analysis of case studies, social marketing provides deep psychological insight to the public policy process and allows closing attitudinal-behavior gap that exists in the traditional transportation planning. As a result, higher level of public acceptance and engagement in promoted activities bring about more successful policy outcomes. Furthermore, careful consideration of the customer attitudes and beliefs, barriers and benefits leads to sustainable behavior change and helps ensure long-term stable results. Establishment of strong partnerships with customers and different organizations makes possible coming up with synergy of undertaken measures further rising success of the policy. Moreover, project piloting helps refine strategies till high level of cost-efficiency and effectiveness can be achieved.

Though social marketing approach allows wise distribution of efforts and resources by emphasizing measures that with high level of probability will lead to desired behavior changes, it does not clearly imply less financial and time spendings compared to traditional transportation planning. As is supported by examples of Lund and Malmo cases, social marketing includes utilization of resource consuming technical measures, such as infrastructure extension and improvement. Additionally, individualized promotional campaigns, test offers, travel surveys and associated evaluations appeared to be time and money demanding as well.

Investigation of applications of social marketing approach based on the cases of Lund and Malmo does not provide toolkit for concrete actions rather gives important guidelines for designing a successful transportation policy. Types of required social marketing measures and amount of required resources very much depend on the local context. People of different cultures might have very different attitudes towards transportation issues, be aware of other barriers and benefits, as well as the ways of engagement in desired behavior change. Suitability of topographic and weather conditions, existing land-use patterns and practices, socio-demographic conditions and level of psychological resistance might affect the success of the policy outcomes and thus should be considered in each area-specific case.

It should be noticed, that results of the given study might also be affected by the choice of employed research methods. For identification of behavior change factors three most commonly recognized theories of behavior change at intrapersonal, interpersonal and network level were used to identify important predictors of environmental behavior that are necessary to address in sustainable transportation planning. However, in psychological science there are plenty of other explanatory theories of behavior change and their careful consideration might reveal additional behavioral factors that have to be considered in the social marketing approach. For instance, the individual level Theory of Reasoned and Planned Actions implies that people act on a conscious basis, which is not always the case. Other theories that recognize unconscious motives of human behaviour like altruism models might provide additional perspectives for how social marketing can contribute to success of traditional transportation planning processes.

With regard to the chosen analytical framework, it was decided to elaborate on it based on community social marketing model proposed by Mc-Kenzie Mohr (1999). However,

employment of other existing models as a ground for analysis, e.g. NOA (Needs, Opportunities, Abilities) (Gatersleben and Vlek 1998) and Stages of Change Model (Prochaska *et. al.* 1992) might result in the identification of other innovative elements of social marketing for traditional transportation planning that may further improve the success rate of existing policy packages.

Thus, while social marketing represents a more holistic, flexible and iterative approach proved to raise the success of transportation policies in Lund and Malmo, it still requires substantial time and money investments, constant adaptation to the area-specific context and further theoretical development.

8. Conclusions

Despite the importance of addressing the attitudinal-behavior gap, traditional policy planning in transportation field fails to account for the complex psychological process assisting people in making their choices. People still appeared to be passive as they lack the motivation to change their behavior which results in policy ineffectiveness. New approaches are required to bring about social behavior change in an effective way.

To understand whether social marketing approach is suitable way of dealing with sustainable transportation issues, two main research questions were posed:

1) Why social marketing is advantageous compared to traditional policy planning in dealing with transportation issues?

2) How can social marketing approach contribute to improving success of existing policy packages dealing with transportation issues?

8.1 Main findings of research

As result of conducted investigation, answers on the posed research questions were revealed. Conclusions section summarizes the main findings of the study that are presented below.

Social marketing provides a new perspective on sustainable transportation planning by incorporating four important elements that are customer orientation, mutually beneficial exchange, relationship thinking and behavior change tools application. These key elements of social marketing are supplemented with psychological insights of most commonly known behaviour change theories reviewed in the thesis - Theory of Reasoned and Planned Actions, Social Learning Theory and Diffusion of Innovation Theory. By addressing important behavioral predictors assisting people in making their choices through these key elements, it becomes possible to close attitudinal-behavior gap existing in traditional transportation planning, which may facilitate public acceptance and engagement leading to more successful policy outcomes. As it has been revealed, customer orientation takes into consideration personal values, social norms and different user segments. Mutually beneficial exchange accounts for perceived behavior control, qualities of the promoted behavior and possibilities to behave in the desired manner. Relationship thinking responsible for peer networks factor. Application of behavior change tools guarantee provision of appropriate information, effective reminders, possibilities and incentives to behave in the desired manner.

As it has been revealed in description and comparative analysis of case studies of Lund and Malmo, eight innovative components of policy planning process within the context of social marketing are considered in comparison to the traditional planning. They are problem definition within strong orientation on customer preferences, differentiation between needs of target audience, identification of barriers and benefits customers concerned with, formulation of several exchange options (sustainable travel alternatives), provision of test offers, utilization of behaviour change tools, stakeholder involvement and piloting before wide scale policy implementation. As a result, social marketing represents much more holistic, flexible and iterative process of policy planning in comparison to traditionally utilized approach of dealing with transportation issues. It increases the success rate of existing policy packages through:

- *Careful consideration of complex psychological process assisting people in making their travel choices.* In comparison to traditional approach, it is recognized that problems do not exist in isolation from the human mind. Accounting for personal needs and attitudes, barriers and benefits customers concerned with are an inherent part of problem-definition and decision-making.

- *Provision of several alternatives to problem solving customized for different user groups.* In comparison to traditional planning, where one way of problem solving is believed to be the best one, social marketing offers several convenient travel options that are better adapted to the needs of various user groups that fulfill their demands, which positively addresses social equity issues.

- *Facilitation of voluntary behaviour change.* In comparison to traditional approach, provision of several travel alternatives, consideration of benefits and barriers to the desired behaviour, utilization of behaviour change tools makes social marketing a soft measure, where people are left to decide by themselves when, where and how to act in a more environmentally sound way. It leads to the voluntary behaviour change rather than forced one through application of 'unwanted policy tools' like road pricing and traffic ban measures.

- *Provision of comparative advantages of new behaviour that makes people to be self-interested in behaviour change.* Understanding barriers and benefits helps identify new options of travel behaviour possess comparative advantage over car driving, which facilitates self-interested exchange, contributing to transportation planning by increasing policy acceptance and public engagement.

- *Risk and uncertainty mitigations associated with new behaviour.* Compared to traditional policy planning, social marketing makes possible trialability of new behaviour through provision of test offers. Once people have the opportunity to experience advantages of the new behaviour and get rid of associated fears, their attitudes are then much easier changed towards more sustainable travel alternative.

- *High level of synergy through stakeholder involvement.* While in traditional transportation planning, decision-making is made by external specialists, social marketing approach involves customers and different organizations at all stages of policy planning. This contributes by improved efficiency in measure's implementation, mutually beneficial decisions, and psychological loyalty, which is especially relevant when benefits of new behaviour are not tangible and are not received immediately.

- *Careful consideration of behaviour response through piloting.* In traditional transportation planning adjustment to the strategies is made on the basis of already implemented solutions. On the other hand, social marketing considers piloting as an important pre-step to policy implementation where behaviour responses are carefully considered allowing one more time to assess needs and preferences of potential clients and reveal barriers to the way of engagement in promoted behaviour. Piloting helps refine strategies until high level of cost-efficiency and effectiveness can be achieved.

- *Going beyond traditional promotion activities.* In traditional transportation planning, promotion of activities is usually limited by impersonal information provision, while in social marketing utilization of behaviour change tools supplemented with

insights of Social Learning Theory increases success of persuasion campaigns. Among most effective tools are norms, individualized communication and non-monetary incentives.

To conclude on contribution of social marketing to the field of sustainable transportation policies, it should be said that social marketing does not replace the use of traditional policy tools, including technical, economic, regulatory and informative measures. It rather provides new perspective of looking on the arrangements required through the lenses of strong customer orientation at all stages of decision making.

8.1 Recommendations for further improvements

Social marketing approach applied both in Lund and Malmo proved to be effective in creating sustainable city traffic. Despite that there are some areas for further improvements that have to be considered by policy-makers.

For cycling:

- Elaboration on test offers for cycling in Malmo is required. It may facilitate behaviour change among the most resistant groups of car drivers. As it has been proved in case of Lund, test offers provide people with possibility to experience advantages of new travel option and mitigate perceived risks.

- Establishment of organization like Lundahoj in Malmo that provides guarded bike parking facilities and associated bike services might be of value. It will help to remove such barrier on the way to cycling, such as fears of bicycle thefts.

For public transportation

- Elaboration on the test offers to try new travel alternative as bus ridership is required in Malmo. Launching test offers in Lund appeared to be very effective measure to facilitating the use of public transportation system. The main constraint to introducing the same practices in Malmo is stringent budget due to substantial financial investments that need to be made in updating the whole public transportation infrastructure.

- Better consideration of public transportation options for people living at the outskirts of Malmo is required. Till now, due to restructuring of the public transportation system aiming to ensure number of bus lines per capita among the lowest in the Europe, some groups of users still appear to be transportation disadvantaged.

For car sharing:

- Further promotion of car sharing activities is required. Nowadays associated services are provided by Lund's Bilpool and Sunfleet companies. Lund's Bilpool does not employ market segmentation techniques and is not interested in wide scale promotion of their activities due to non-commercial basis of the scheme. Though Sunfleet represents commercial alternative of car sharing both in Lund and Malmo, it still operates on the pilot stage and till now appeared to be not very much successful in its marketing campaigns. Reasons to this are time and money

constraints, as well as some technical (computer) failures that occurred during individualized information dissemination.

- Better integration of car sharing with public transportation and cycling measures will allow increase city traffic intermodality both in Lund and Malmo. Until now car-sharing stations are not always located in convenient conjunction with other travel modes, which creates certain difficulties when change of different transportation alternatives is required during the trip.

- Better identification of barriers to engagement in car-sharing scheme is also needed. So far, only feeling of impersonality in owning the car is revealed. The reason of poor knowledge about barriers customers concerned with are low level of responses to the questionnaires conducted. Further communication with clients will allow better adaptation of car sharing services to their demands.

- Elaboration of test offers is required to provide people with trialability of new travel option. Till now neither in Lund, nor in Malmo such practices of facilitating behaviour change towards use of more sustainable transportation alternative have been utilized.

In addition to already mentioned recommendations, it should be noticed, that on the general level of policy planning one of constraints is associated with often changing management, which is especially common in Malmo. It leads to loss of information and weakens coherence in measure implementation. Commitment of management to the transportation policy planning issues during the whole duration of the project is required to ensure higher success rate of the transportation policies.

8.3 Implications for future research

Based on the findings of the current study, the following areas for the future research have been revealed:

- *.Further theoretical development of the social marketing approach.* Overview of wider variety of theories of behaviour change will reveal more psychological factors assisting people in making their choices and that are important to account for in transportation policy planning. Also, application of other psychological models as a ground for analytical framework might provide additional perspectives for how social marketing can contribute to success of traditional transportation planning processes.

- *Further research on market segmentation techniques.* As it has been noticed in the Diffusion of Innovation Theory, differentiation of audience in accordance to their readiness to accept the change might further contribute to success of the policy planning and facilitate efficiency savings by focusing more efforts on most resistant population groups. So far, such method of treating the target audience is not applied in Lund and Malmo. More careful research and evaluation of deployment of new techniques of market segmentation is thus required.

- *Further research on travel patterns of clients that are members to car-sharing schemes.* To respect the privacy of individuals and business organizations, little research is done on how customers of car-sharing clubs are traveling. Deeper investigation of the travel patterns might provide better solutions for location of car sharing stations and

organization of travel matching services that will further increase the utilization of shared cars.

- *More exploration on strong and weak points of social marketing.* Further application of social marketing approach in other cities with different local conditions like geographic, socio-demographic, urban planning situation etc. will help revealing more strengths and weaknesses of social marketing approach.

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Personal Communications

Anders Soderberg. Mobility Management Officer in Lund and Project Coordinator of the LundaMaTs. Personal interview, Lund, 29 April 2009

Anna Karlsson. Manager of bicycle and pedestrian projects at Lund Municipality. Personal interview, Lund, 22 April 2009

Linda Medberg. Measure leader of managing mobility needs of private persons and business sector in Malmo. Personal interview, Malmo, 23 April 2009

Per Muhrbeck. Secretary at Lund's Bilpool car sharing club. Personal interview Lund, 16 April 2009

Pernilla Hyllenius. Officer at TRIVECTOR Traffic AB. Personal interview, 21 April 2009

Peter Nilsson. Measure leader of integrating cycling with public transportation in Malmo. Personal interview, 20 April 2009

Abbreviations

GHG: Greenhouse Gasses

TDM: Transportation Demand Management

LundaMaTs: Environmentally adapted transport system in Lund

CIVITAS: CIty-VITAlity-Sustainability project

CIVITAS SMILE: City-Vitality-Sustainability, 'towards Sustainable Mobility for people in urban' project

SME: small and medium size enterprises

NOA: Needs, Opportunities, Abilities

SEK: Swedish crowns

Appendix

Appendix- 1: Interview Questionnaires

Per Muhrbeck

1) Can you please introduce yourself and tell few words about the Lund's Bilpool company (when it was founded, how is it organized: open/close, private non-profit?)

2) What is the goals pursuit by your company? (Are there any environmental goals pursuit? Does it change over time? As there concrete goals to alter the behavior of people towards the use of car sharing (certain percentage increase in use of your services?)

3) What was the scale of the business in the very start and now (constantly growing demand from the customers?)

4) Who are your customers, do you try to differentiate between various users groups in regard to services provided?

5) How do you attract customers to use your services (benefits you offer compared to private car use)?

6) What kind of evaluation studies do you conduct to know about travel patterns of your customers? Are you providing matching services so that commuters to one destination can find themselves?

9) Did you have the feedback system to get the reflection on the services you provide to customers, what types of questions are usually asked?

10) What barriers/ fears do people experience to become a member to car-sharing scheme? How do you overcome it?

11) What kind of the measures you perform to let people know about the services you provide (advertisement, communication to people via sending the mails etc)?

12) What campaigns are you carrying out to increase awareness of people about car sharing activities and to demonstrate environmental benefits of car-sharing schemes?

13) What are the stakeholders involved in provision and support of car-sharing services?

14) What are your suggestions for further improvement and development of car sharing services?

Linda Medberg and Anders Soderberg

1) Can you please introduce yourself and tell about the main goals of mobility projects you run? Any concrete targets are set in changing the behavior of people?

2) What activities do you perform to discourage the use if private cars and promote (cycling/bus ridership/car sharing)

3) How individualized marketing campaigns are organized to reach the target audience?

4) How do you differentiate between different target groups to better meet their transportation demand?

6) What campaigns are you caring out to increase environmental awareness of people and show the privileges of alternative modes? Can you tell more about the SMART road users, Health-bikers, Test-riders, campaigns: "Companies on bikes", "No ridiculous car journeys"?

7) What is behavior change tools utilized? (prompts, commitment, norms, etc. – please, elaborate on this more)

8) What is the main barriers/fears customers experience to switch to cycling/bus ridership/car sharing? How are you dealing with it?

9) Do you have a well elaborated feedback system (forums) the customers can express their experience. Do you adopt the changes in the program due to their inquires?

10) What are the stakeholders involved in promotion of sustainable travel options and what benefits does it bring?

11) What are the possibilities for improvement and development of transportation system (regional level)?

12) How the behavior change is measured (surveys, types of questionnaires)?

Peter Nilsson and Anna Karlsson

1) Can you please introduce yourself and tell about the main tasks of the project on integrating cycling with public transportation? Were there any concrete targets set (like 6% increase in bicycle share compared to 2003 level, increase safety and convenience etc.)?

2) Before defining the goals do you conduct the surveys on the needs of your customers? If yes, what were the issues people were concerned with and what improvements they would like to see?

 3) How the project has been initiated and who sponsored it?

4) What are the measures you undertake to make the use of alternative modes more attractive and convenient for citizens (multifunctional parking facilities, bicycle detectors, dedicated bicycle lanes etc. –   please, elaborate more about it)?

5) What are the measures you apply to raise the awareness of people in environmental issues and let them know about the activities you carry out? (Individualized marketing campaigns when you reach people by personal communication, information shits, 3d demonstration models, handbooks – please, elaborate more about it)?

6) What are the marketing campaigns you launch to show the benefits of cycling and promote it? ("companies on bikes", any campaigns among students?)

7) How did you differentiate between the different target groups to get them involved into cycling activities (good bike prices for companies, students etc, proximity of parking facilities to working places, to universities)?

 8) What are the fears/barriers people concerned with when they are asked to give up private cars and switch to bicycles (like inconvenience in parking – far away from bus/train stations, lack of cycle garages, safety issues)? How do you overcome it?

9) What barriers do you face in promoting bicycles and integrating cycling with public transportation (institutional, financial etc)? How are you dealing with it?

10) What are the stakeholders involved in the project? (networking with municipalities, skanetraffiken etc.?) What benefits does it bring?

11) What kind of behavior-change tools do you utilize to encourage people to try biking (information shits, verbal commitments to try the bicycle use etc)?

12) Are there facilities for renting the bikes, with bike stations throughout the city where you can pick up the bicycles? If yes, how it is organized to make it convenient, accessible and affordable?

13) How do you evaluate changes in the travel behavior? Any figures on modal split before the campaign was launched and afterwards?

14)Do you have a well organized feedback system where the customers write about their experience, propose improvements so you can constantly adjust the program to better meet customer needs?

Pernilla Hyllenius

1) Can you please introduce yourself and tell about consultancy services you provide to support municipality in creating sustainable city traffic?

2) What evaluation methodology do you apply to assess level of awareness and travel behavior change among residents?

3) What stakeholders are involved in dealing with sustainable transportation issues and what benefits such partnerships bring?

4) What are success factors of transportation policy in Lund?

5) What are recommendations for further improvement and development of environmentally sound transportation systems?