



COST 358 Pedestrians' Quality Needs

PQN Final Report





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Pedestrians' Quality Needs

Part C Executive Summary



November 2010



PEDESTRIAN QUALITY NEEDS
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Colophon:

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1. INTRODUCTION

The Pedestrians' Quality Needs Project (PQN) established what people need to choose to walk. This summary provides an understanding of those needs and how they can be met and supported by policy.

It is hoped that this summary will help practitioners:

1. Improve their understanding of how the management of public space, the transport network and the social, legal and political context interrelate to influence pedestrian behaviour.
2. Advance the effectiveness of future policy to support and encourage more walking
3. Enthuse relevant organisations to work collaboratively at a local level to ensure the full potential for more walking is realised.
4. Stimulate further research projects to benefit pedestrians in Europe.

The PQN Final Report consists of 3 main parts. Part A (Introduction and conceptual framework) and Part B (Documentation) contain the detailed project results. Part C, the report in front of you, gives general information about the project results. Part A and B are an integral part of the PQN Final Report, but, because of the large volume of the report parts, they are captured on a CD, which also contains a folder with additional documentation that was produced in the context of the project such as the Country Reports, a Short Term Scientific Mission (STSM) report about pedestrian conditions in the PQN countries, a literature study, that was carried out to support substantiation of the PQN model policy process and the results of a survey on data availability in European countries.

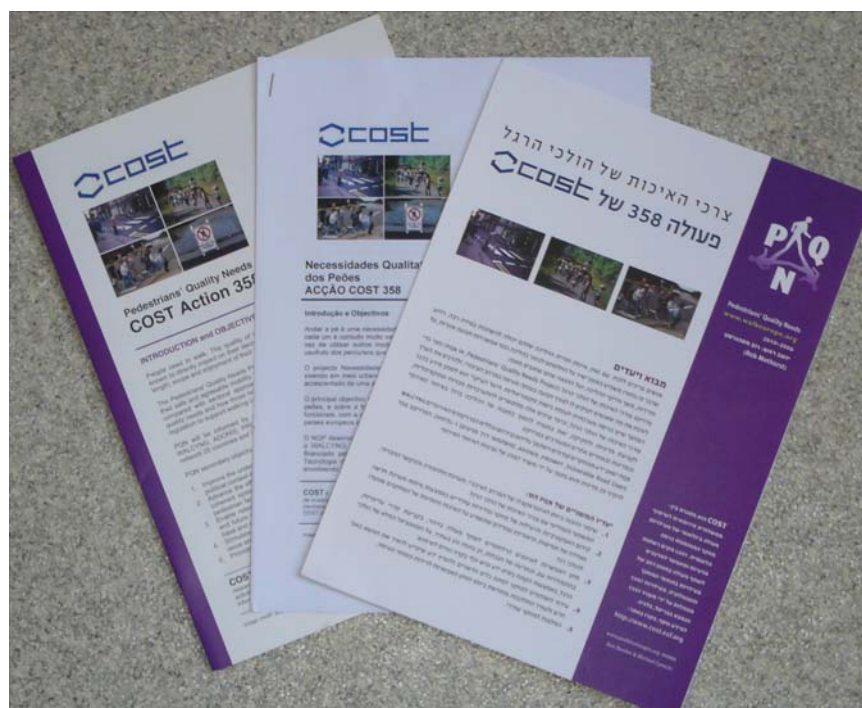


Figure 1 COST 358 Pedestrians' Quality Needs promotion leaflet in languages of partner countries

2. BACKGROUND AND CONCEPTUAL FRAMEWORK

People need to walk. The quality of their experience however can vary greatly and this in turn is known to directly impact on their decisions to choose to walk instead of choosing other modes and the frequency, length, scope and enjoyment of their trips.

Walking is such a basic way of travelling that it is easy to forget its importance. Walking however should be considered as the essential lubricant of the transport system. Although almost everyone agrees that it is important to have pedestrian facilities, few politicians give it priority, except in public areas where there is a dominant economic or social reason to care for pedestrians, like shopping streets and malls, or parks. For pedestrian policy to be further developed and implemented a new impulse is clearly needed.

The Pedestrians' Quality Needs Project (PQN) was established to innovate policy development thinking and to show how policy could be developed. The project aimed to identify what people need for their safe and comfortable mobility in public space, to show the added value of a systems approach, compared with sectoral approaches. PQN was informed by and built upon the research published by previous studies (including WALCYNG, ADONIS, PROMPT, Vulnerable Road Users and HOTEL). The project networked 20 countries and was supported by the COST office of the European Commission.

PQN objectives were to:

1. Improve the understanding of how the management of public space, the transport system and the social, legal and political context interrelate to meet pedestrians' quality needs.
2. Advance the effectiveness and efficiency of future policy and research by developing a new and coherent system of concepts, theories and models to influence the quality and provision of pedestrian facilities.
3. Enable relevant organisations to work together to build an accessible knowledge base and easy to use auditing tools to overcome current practitioner uncertainty on how to identify, prioritise, and meet the full needs of pedestrians.
4. Stimulate partners to innovate tools and disseminate knowledge that help to shed new light on the issue and stimulate a new enthusiasm to provide for pedestrians
5. Provide recommendations for further research.

Before making a commitment to improving the experience of pedestrians in any given community it is helpful to strategically assess how mature existing policy for pedestrians is. Policy can vary considerably between communities. In some cases policy could be described as 'pathological', where an authorities' attitude is: *'who cares as long we are not caught or sued'*. In the majority of cases however the attitude is more likely to be 'reactive': *'the quality of a pedestrian's experience is important, we do what we can whenever we get a complaint'*. Others may have a more 'calculative' approach: *'we have systems in place to manage hazards'*. The ideal authority will have a more mature 'proactive' attitude to the issue: recognising *'the quality of a pedestrian experience as a source of wealth and health'*.

An authority with a mature, proactive policy will be aware of the options for improving the quality of a pedestrian experience. A systems approach can provide a structured insight to these options and ensure outputs and outcomes are related to proactive decisions.

The PQN system approach features three interrelated dimensions: context, content and process. The process starts with setting general quality targets for meeting the needs of pedestrians - which provides a reference vision. By evaluating then the actual state of the current provision it is then possible to explore what options are available for improvement before deciding which interventions are to be made.

A multi disciplinary approach to look beyond short-term options and consider the wider context, long term trends and the need for more fundamental changes is more likely to provide a more effective impact on pedestrians.

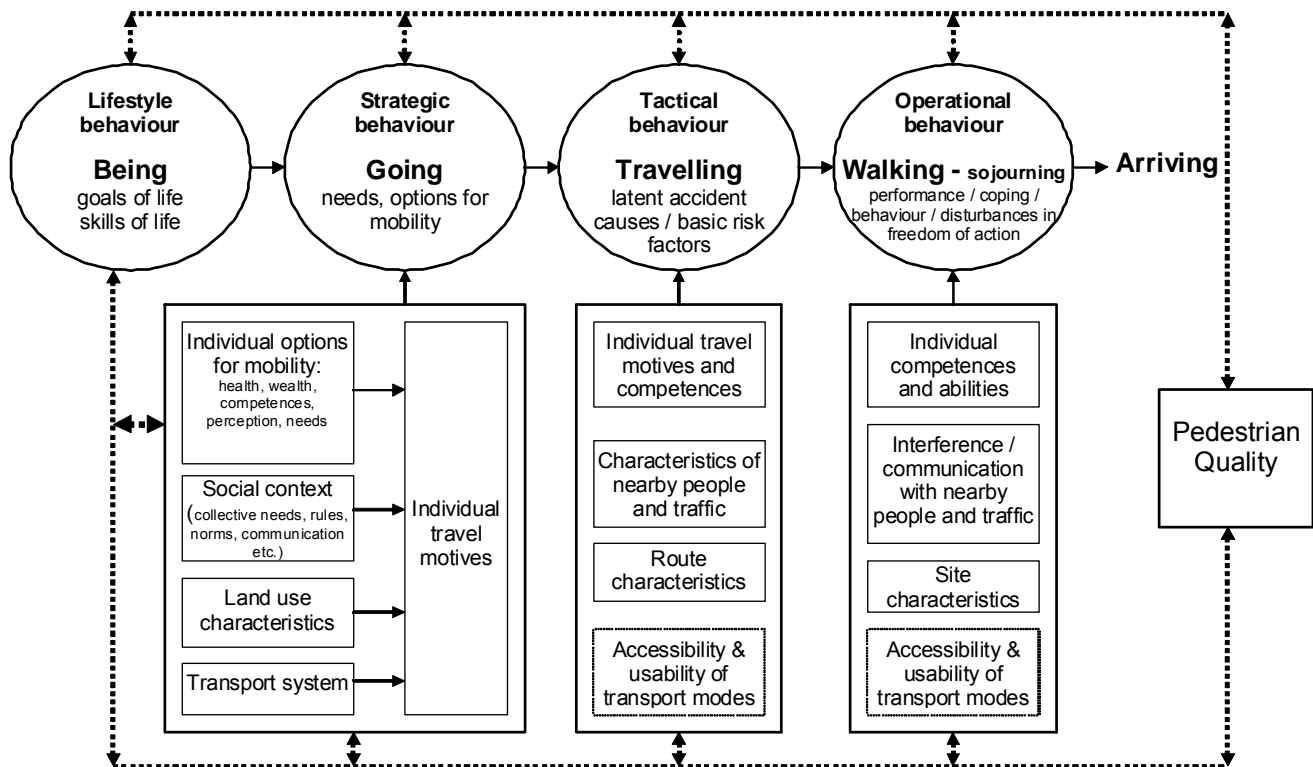


Figure 2 The pedestrian system

Policy development using a systems approach will result in a multi-level, more comprehensive and integral programme of improvements. New interventions however need to be connected to other, accepted policy plans for economic development, urban planning, transport and mobility planning, or planning for the environment, safety and health.

In simple terms, the PQN system approach is built on three principles:

1. A focus on the pedestrian
2. A comprehensive analysis of the system
3. A multi-layered integrated development of policy.

The principles have been considered by an analysis of the PQN System from three perspectives:

1. *Functional perspective:*

What is being offered to meet the needs of pedestrians? - The experts' perspective focusing on the supply side of facilitating pedestrian activity.

2. *Perception perspective:*

What is being requested to meet the subjective quality needs of pedestrians? - The pedestrians' perspective focusing on the demand side of facilitating pedestrian activity.

3. *Durability and Future Prospects:*

How can decisions be balanced to take into account the interests of pedestrians in the future? - Experts' opinions on facilitating and sustaining pedestrian activity.

The PQN Project studied these perspectives and a summary of the groups' findings are provided in this document. The Project further integrated the different approaches in an attempt to find an acceptable balance between them and steer a coherent policy direction.

3. MEASURING WALKING

Introduction

Walking is an inherent characteristic of being human. It is such an ubiquitous activity that it is often not regarded as a transport mode at all. However, even in highly motorised societies, it is an important component of almost all trips and in most places it still remains an important mode in its own right.

Walking is also very complex. Anyone who has observed pedestrian movements, interviewed people about their motivations and perceptions as pedestrians and tried to plan according to their needs knows the intricacies associated with walking. It is these elements which make walking and the research about it so fascinating.

Creating good urban spaces requires the knowledge of the characteristics of walking and the needs, abilities and wishes of pedestrians. Only if we understand these 'system properties' are we able to create appropriate institutional frameworks, devise good policies and design, build and maintain adequate facilities for pedestrians and sojourners. Only based on the characteristics can we communicate and promote walking in successful ways and measure walking adequately.

Measuring walking also serves as a crucial ingredient to inform policies, planning and promotion and to assess their impact. Good decisions are based on reliable information which in turn is gathered with adequate measuring tools. Measuring is one of the hinges to success.

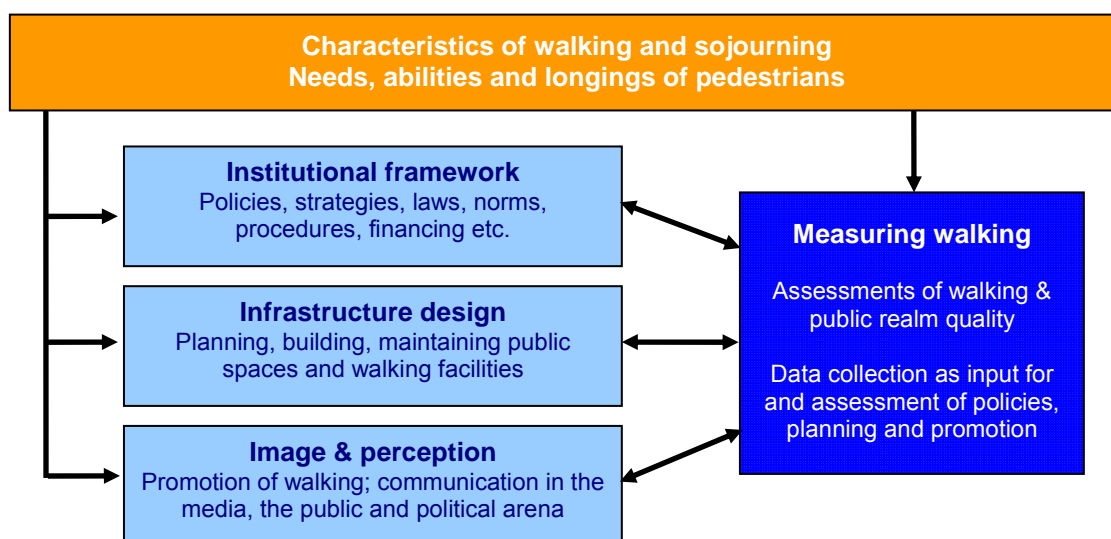


Figure 3 The role of measuring walking in the context of policies, infrastructure design and image and perception; all based on the characteristics of walking

If we want to enhance the role of walking, we need to improve the data situation. This means we need to develop good indicators and adequate data collection methods for measuring walking and public space qualities. Until now hardly any data on walking and public space qualities has been collected. Many of the contributions presented in the final reports of the Pedestrian Quality Needs project illustrate this. They also point to the short-comings of the existing methods. These methods are often so diverse and the data collection of such

uncertain validity that it is almost impossible to compare data from different sources. We need not only to develop adequate and innovative methods but also to reach some common standards. Two steps are required to achieve innovation and standardisation: First, data collection methods have to be based on the awareness of the characteristics of walking as well as the needs, abilities and wishes of pedestrians and sojourners. Secondly, a minimal standardisation and harmonisation of indicators and data collection procedures is necessary, so that results are comparable.

The papers in this 'measuring walking' section deal with both issues. In the opening contribution the process towards internationally standardised monitoring methods is presented followed by three papers which introduce innovative methodologies. The first of these papers deals with measuring emotional responses evoked in pedestrians by different urban spaces. The subsequent contribution explores new ways of assessing the influence of architectural and urban atmospheres on the way we walk in town. The fourth paper describes a newly developed tool for counting children on the street to assess their risk exposure.

Towards internationally standardised monitoring methods

When the Pedestrian Quality Needs (PQN) project started and with it the collection of data, we realised quickly that there was very little information and that the data were collected in so many different ways that the results could not be compared. Instead of (once again) deploring this fact, we decided to embark on a project – parallel to the three main working groups and in cooperation with the Walk21 international conference series – to start a discussion and standardisation process with the aim of establishing international guidelines for the collection, analysis and dissemination of qualitative and quantitative techniques for measuring walking. This situation is also a window of opportunity to establish some common ground before everyone creates their own typology and data sets.

The project builds on already existing knowledge with no intention to standardise everything. Innovation and minimal standardisation should complement each other. The goal is, thus, to find some common ground on selected indicators and methodologies. Ideally, this process is a global and not just European one and that is why every year full-day workshops are attached to the international Walk21 conferences. This broad discussion process involving experts from many different professional and geographical backgrounds is by its nature very slow but is gaining the legitimacy necessary for globally shared standards. For more information on the workshops and progress made, please visit the website: www.measuring-walking.org

A survey was conducted in the early stages of the Pedestrian Quality Needs project to establish the current data collection situation in Europe. 10 countries took part in the survey and provided information about what kinds of data are already available and how they are collected: Belgium, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain and Switzerland.

The results not only confirm how little data are actually collected but also show the wide range of methodological approaches. Except for data on traffic accidents and on walking trips there is very little systematic collection of data done. Where information exists, it usually stems from single projects or case-studies. Even in the areas where statistics are available, walking is often not properly accounted for. An example of this is the lack of recording short trips (e.g. below 1 km or 1 mile) or the problem that only main modes are recorded which neglects stages to and from other transport modes. Generally, the methodologies are



inadequate to assess walking and lead to a significant underestimation of walking, to biased results and inadequate conclusions.

In addition to the survey, in-depth discussions with representatives from a range of cities were held. As a result of the discussions, these main obstacles and problems contributing to the paucity of data emerged:

- Lack of sensitivity and political will to collect data on walking
- Data is collected in a fragmented and inconsistent way
- Indicators and/or methods are not appropriate for walking
- Restricted funding for studies and data collection on walking
- Staff lack knowledge and time to analyse and make use of data
- Information is there, but not edited for use
- Existence of data is not known or hard to access

From the survey results, our own research and the discussions with city representatives we conclude that the available data gives neither a comprehensive nor adequate picture of today's pedestrian situation. The reasons for this situation are distorted definitions and terminology, inadequate methodologies, biased perceptions and structural obstacles (see also Sauter 2002).

Given this situation, a new comprehensive look at how walking could be measured is needed. Over the course of this PQN action and as a result of the many discussions among professionals and data users, we developed a comprehensive Assessment Model to measure walking. It is the main result so far of the standardisation process and is intended to serve as a reference point to ensure walking and public space are considered in a comprehensive and comparable way. The Assessment Model stands on four main pillars: input, output, outcome and impact which are characterised as follows:

- *Input* describes the institutional framework in which walking happens and informs about the financial, material, organisational and human resources made available by authorities as a basis for providing good walking conditions. It specifically comprises the leadership of politicians and (senior) officials, strategies and policies including laws, norms and procedures, the resources allocated (in terms of staff and funding), the research settings and the co-operation within and between administrations: It also includes citizen participation and partnerships with private stakeholders.
- *Output* focuses on products and activities by (institutional) actors, which are achieved through their efforts and activities. Outputs in the field of walking comprise land-use, the resulting accessibility and the (degree of) integration between different modes; infrastructure provision, features and qualities of public spaces; information, promotion and the marketing of walking and the enforcement (e.g. re speeds and parking of motor vehicles).
- *Outcome* is the primary and immediately observable result of input and output. It is, for example, measured as levels of walking and sojourning, user activities and behaviour, also in terms of accidents (with vehicles or as a result of falls) and security (threats and attacks). Outcome can also be observed as atmosphere of a space which is created by the people using it. The final, yet crucial dimensions are perceptions and levels of satisfaction, attitudes and motivations as well as expectations and wishes of users or non-users and of politicians and the media.
- *Impact* is a secondary outcome usually with longer lasting, often indirect effects. It is often hard to measure. We can distinguish between individual and collective effects with the latter usually being of most interest. They include the bottom-line economic, ecological and social benefits (effects) and can also be discussed in terms of specific effects regarding transportation or health.

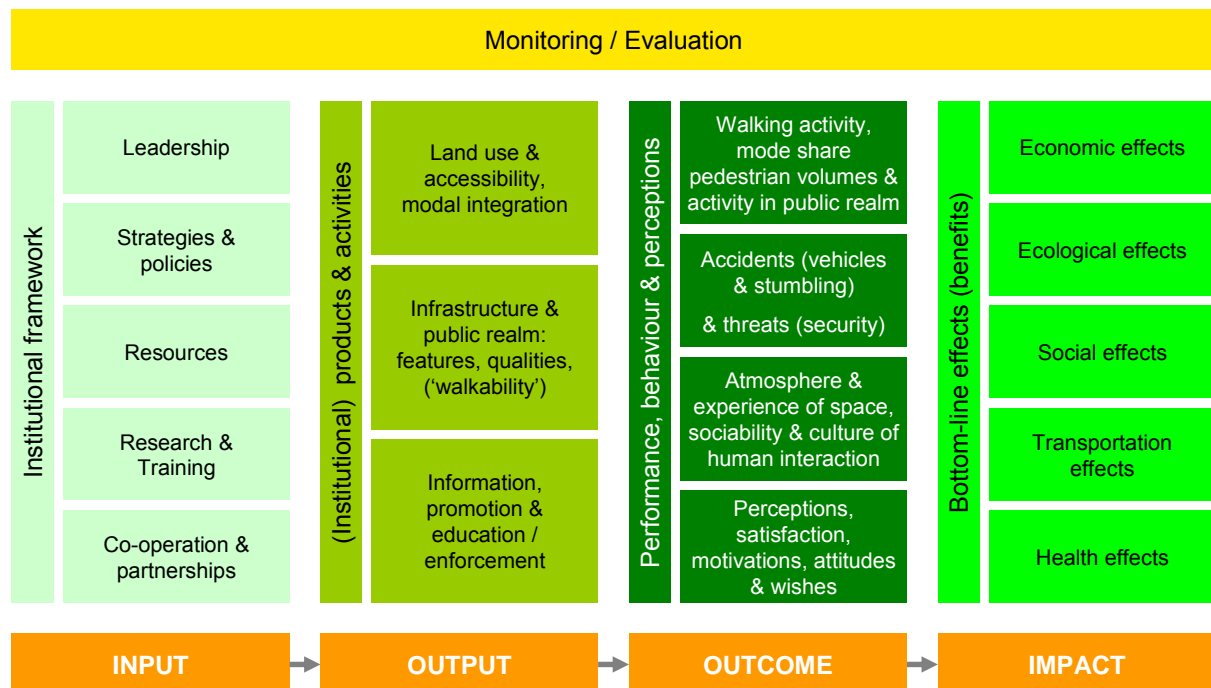


Figure 4 Assessment model for measuring walking

While the current analysis of walking usually focuses on 'output' and 'outcome', that is, mostly on the qualities of the walking environment and on walking activity, the political discussions and decisions often involve 'input' and 'impact' factors, e.g. investments and ecological or economic effects. So it is important to look at all relevant factors right across the board.

Given the objective to define adequate standardised methods to measure walking, a list of indicators has been drawn up based on the Assessment Model. From this a set of key performance indicators will be selected. These key indicators should address different user needs, assessment fields and provide practical tools to measure. In the subsequent step, specific methods for data collection relating to the chosen indicators will be defined to make the results minimally standardised and comparable. Eventually, four final products with standardised key performance indicators and methods can be envisioned:

1. Walking Account or Urban Life Account: it would provide a set of key figures for each city to benchmark itself against other cities or towns.
2. Public Realm or Walkability Assessment: it would focus on the qualities of specific spaces, e.g. a square or a street.
3. WAPAD or Walking Policy Audit Tool: it would analyse in detail and in a comparable form the input side, in particular the institutional framework and;
4. Community Street Audit: it would evaluate the quality of streets and spaces from the viewpoint of the stakeholders i.e. the people who use them.

Three examples of innovative methodologies

Mapping emotions of the urban pedestrian. The pilot study by Carsten Hogertz explored the link between the urban environment and psycho-physiological arousal responses based on the idea that different urban spaces influence the emotional experience of individuals. 30

participants walked a predefined route in the city of Lisbon equipped with two devices: (1) a GPS logger which continuously determined the position of the moving pedestrian and (2) a wearable wristband sensor which measured the emotional responses based on electrodermal activity. To control for accuracy, participants were asked at the end of the route to report their emotional states during their walk. This was then compared to the data from the bio-sensor. The results show that the persons' emotional responses are adequately signalled by the electrodermal activity. A closer analysis suggests that the negatively valued experiences and locations are better recorded than the positive ones. Other arousal-eliciting stimuli were locations with novelty of cognitively demanding situations, such as wayfinding or crowding. The real-time and real-life information gained from this research can contribute to a better understanding of the arousal reactions towards different urban settings in qualitative as well as in quantitative terms.

Urban atmospheres shaping the way we walk. In her contribution, Rachel Thomas asks how and to what extent architectural and urban atmospheres affect our decisions when walking and influence our gait. The study is based on three complementary methodological approaches: (1) In the first-person ("I-walk"), the researcher is immersed in the study zone recording impressions, noteworthy events and situations. (2) In the second-person ("you-walk"), the researcher accompanies pedestrians on a portion of their journey and questions them about their route choice, reasons etc. (3) With the third-person ("he or she-walks"), the researcher follows unidentified pedestrians at a distance, paying attention to their behaviour, social contacts and body attitudes. Based on the results different sensory configurations are identified, some more conducive to walking than others. In a busy street with significant design faults and dense, multimodal traffic, walking can be pleasure because of the attractive social atmosphere and the rhythm of a place. Contrary, a space may offer pedestrians ideal conditions – wide pavements, smooth surfaces, agreeable lighting but they feel bored and ill at ease because of the anti-septic environment. Walking there turns into flight to cross the space as quickly as possible. The walkability of a place or neighbourhood may be determined by its material design, but what motivates a pedestrian to walk is the atmosphere, the quality that speaks to the senses, stimulating emotion and exchange. In times when streets are intended to channel crowds and to smooth the rough edges of city life, being aware of the importance of atmospheres offers a way to look at a broader meaning of successful urban design and city walking.

Counting children to assess their risk exposure. Pedestrian 'exposure' data are required for many reasons: to study links between walkability and the actual amount of walking, to assess network improvements or evaluate accident risks. There are currently few tools and little quantitative data available to record the presence of pedestrians, especially children, in urban (or rural) road networks. The method suggested by David M. Zaidel, provides a representative estimate for the presence of (child) pedestrians on the street network of a neighbourhood or town. The data recording is based on (1) a systematic sampling of neighbourhoods in a community (2) a circuit driven in a car that covers typical sub-areas of the neighbourhood and passes by many of the children's destinations and (3) by recording the number and various characteristics of child pedestrians and cyclists noticed along the driving circuit. The recordings result in an overview count of children being present at several times over the day. From this, different questions can be answered, for example, how many children walk alone, in groups, with an adult and how many use a bike. It can also provide information about how many of the children who inhabit an area actually go out on the streets. In addition to providing interesting raw count data, the method provides a measure of pedestrian exposure that is conceptually similar to vehicle exposure measures and their use in road risk assessment. The measuring process is intuitively simple, requires little training and no special equipment. It can handle a large range of pedestrian densities.

Conclusions

A crucial aspect to improving the urban environment for pedestrians is the measuring of walking and sojourning activity. Data should inform policies, planning and promotion and assess their impact. Yet, the current data situation, despite some improvements, is dismal. Distorted definitions, inadequate methodologies, biased perceptions and structural obstacles lead to a lack of data and an inadequate picture of today's pedestrian situation.

It is, however, no longer sufficient only to complain about this. It's time to act and to use this window of opportunity to create international guidelines for the collection, analysis and dissemination of qualitative and quantitative techniques for measuring walking. The PQN project has embarked on this long-term project – but a lot remains to be done. Two main continuing steps are needed:

- 1) The standardisation and harmonisation process ought to continue. This requires an appropriate international forum for exchange and discussion. A new COST Action specifically focused on this topic may be the right format, but conferences and workshops would also help. It is important to involve the broad field of experts and practitioners associated with walking, broad both in terms of their professional and their geographical backgrounds. The collaboration with cities is crucial. The planned PAICE project (Pedestrian Appraisal, Investment, Coordination and Evaluation) by Walk21 as one follow-up of PQN will be an opportunity in this regard.
- 2) New innovative methods have to be developed that build on the characteristics of walking and, thus, secure accurate measurements. Establishing national and international research programmes to allow a systematic and coordinated effort are also needed. The gaps in walking research are still huge, particularly compared to other transport modes. Special efforts are, thus, warranted and the benefits are obvious when we look at the challenges our societies face: climate change, peak oil, health crisis, etc.

4. FUNCTIONAL NEEDS

Introduction

The most basic order of needs covers the ‘rational’ perspective of the current situation. This work¹ focussed on the physical and observable (‘objective’) needs of pedestrians, visible and objective behaviour and the ‘technical’ ergonomics with regard to the physical and social environment and the transport modalities. This explored the presence and behaviour of pedestrians in public space, and the relationship and influence of mobility, safety, physical health and exclusion.

Insight on needs and the degree to which they are satisfied was gathered by the following approaches:

- identify what pedestrian activities, risks and ergonomic issues are observed and reported;
- identify what recorded norms, policy objectives and solutions there are with regard to facilitating and supporting pedestrian activities;
- analyse inter-relations between offered facilities and observed pedestrian activities and risks.

Methodology, process and coverage.

The first step in the analysis process was to derive from the Conceptual framework a number of key questions to be researched. In fact the questions concern all elements in the system (pedestrian, other humans in the environment, the physical environment, the social environment and transportation) as well as pedestrian activity levels (Lifestyle & strategic decision, tactical decisions and operational behaviour). The questions that were identified were:

- A. What is known about presence, mobility and safety characteristics of pedestrians in public space?
- B. To what extent do initial choices regarding residence, work place, recreation and social relations influence walking options?
- C. What ‘objective’ factors and mechanisms determine the pedestrians’ travel and/or sojourn motives?
- D. Which physical and safety needs do they relate to?
- E. What ‘objective’ factors and mechanisms determine the pedestrians’ routing and sojourn decisions and safety precautions taken?
- F. What tasks are pedestrians to perform?
- G. To what extent are individuals able to perform these tasks and what groups can be distinguished?
- H. Which facilities and provisions are (implicitly) required for performing the tasks adequately?
- I. What are the risks?
- J. What are the (basic) risk factors and what are favourable factors?

¹ This section summarises the results from PQN Working Group 1 Functional Needs.

- K. What factors determine pedestrian quality from a functionality perspective?
- L. What measures, interventions, policies and strategies can improve the pedestrians' situation?
- M. What integral policy programs need to be recommended in relation to their context?

Because of the limited number of participants and the focus of their interest not all key research questions could be uniquely allocated. Some chose to cover a question in total, others chose to only deal with a sub-question from their expertise. In total all elements of the system and all activity levels were at least to some extent dealt with. In the project's context it was not an option to enforce equal and consistent coverage, rather the PQN project group was aware that at the end of the project there would be gaps in coverage, to be dealt with in future projects.

The study work concentrated on reviewing literature, gathering available statistics and re-interpreting available research data. Apart from a short survey of current practice with respect to pedestrians in each country involved in the project (and the production of Country Reports), no original surveys were undertaken. Whenever possible the work resulted in recommendations regarding standards for land use, public spaces, information, legislation and transport modes, allowing for substantially different situations in the participating countries and sub-regions.

For quality control all papers were reviewed internally by other partners in the working group and most of the papers were externally reviewed. The reviews did not target at achieving the extreme high scientific standards used for scientific journals like 'Accident Analysis and Prevention' and the 'Transportation Journal'. The aim of the reviews was to safeguard usefulness for practitioners and to provide inspiration for further research.

Key findings

First orientation on common practise. The first step in the project was to develop Country Reports on the state of affairs in the participating countries. COST offered grants for Early Stage Researchers to do a Short Term Scientific Mission (STSM). Within the context of such a STSM by Dell'Asin, the content of the Country Reports was studied and related to results from earlier international research projects. Additionally she evaluated a sample of European cities. It appeared that nearly all cities have implemented measures to improve public spaces, networks and sites. Good examples of site level interventions concerned improvements of crossings and public transport waiting areas. Network level intervention examples concerned link improvements and route improvements, like traffic calming. Examples of structure level measures included the quality of rest areas, meeting places and squares, as well as zone interventions (school zones, residential areas). It is however obvious that even the good examples do not score on all of the key quality factors (connectivity, conspicuity, comfort, convenience and conviviality) at the same time.

Availability of data. One of the benefits of a systems approach is that it produces insights enabling researchers to actively check for completeness and validity of data resources. The systems approach provides a framework for looking at the data from a wider perspective than commonly used. Cabello, Sanchez, Martin, Belén Cabello, De Goede, Van der Horst, Conde and Romay found that the availability and the quality of data on mobility and safety leave a lot to be desired. Pedestrians are disproportionally underrepresented in police crash statistics and in mobility surveys. The accuracy and completeness of these data are not always satisfactory. Internationally, sets of data are only roughly comparable; information is



sparse on several countries' websites, and some of them are only written in the national language; in addition to national level information there often is a huge amount of data from dedicated local projects, but these are hard to compare to other data sets; surveys about short distance mobility are mainly focussed on cars and public transport and for longer distances it is wrongly assumed that cars and public transport are the only options. An important impediment to proper coverage of the pedestrian issue is that the definitions used for acquiring the data do not cover important aspects of walking and sojourning. This is a great obstacle to proper attention to the pedestrian issue.

Understanding the magnitude of the issue. The magnitude of a safety problem for pedestrians cannot be convincingly shown without reference to the magnitude of the problems of other groups. Hakkert deals with analysis of the aspects related with the concept of *pedestrian risk and risk factors*. His chapter sets out with a definition of the three central terms used - accidents, exposure and risk. The conclusion reached is that there are general definitions of exposure and of risk as used in the health prevention and risk analysis fields but that in the road safety practice these terms should be defined within the context of the issue studied. In the context of this project, exposure is meant as exposure to risk. The measure of exposure is generally defined as some form of the amount of travel, either by vehicle or on foot. Risk is used to mean the probability of an accident occurring, weighted in some way by the severity of the accident's outcome. In many cases it would be better, and more neutral, to refer to rates and not to risks. Hakkert concludes that very little is known quantitatively about walking. The amount of walking, including short trips and trips which are part of a motorised journey are generally not recorded. Another related issue is that little is known about the number of road crossings by pedestrians, an indicator which could be used to calculate the crossing risk.

For each application, the correct exposure measure should be used. This is sometimes made impossible because the required information is not available, or has to be collected at great cost. For a valid comparison a measure must be used that is comparable for all of the groups included in the equation. In most cases the only measure available, which to some degree qualifies, is the number of reported accidents or casualties per inhabitant. With regard to setting targets at the national level, the use of numbers of casualties is preferred above setting targets in terms of risk.

Use of combined data sources. Usually the safety of walking is assessed by using road accident data, as they are reported by the police. Feypell – De la Beaumelle, Papadimitriou and Granié (courtesy the OECD / International Transport Forum Working Group Pedestrian Safety, Urban Space and Health) take a different perspective. They find that an important downside of this practise is that the definitions used for acquiring the data do not do justice to the safety of walking and sojourning. By combining multiple data sources, such as police accident records, hospital records, medical emergency services records and sometimes insurance records, a much better understanding of the state of affairs can be produced. From road safety data it shows that the number one issue of pedestrian safety is crossing accidents. From combined safety data it appears that, depending on the winter situation of a country, while travelling, 3 to 9 times more pedestrians are injured by falls than by collisions with traffic. With the ageing of the population the share of injuries due to falls in pedestrians will increase substantially. Calculations regarding societal costs showed that about 15% of all travel accidents (including those by other modes) costs are related to falls by pedestrians. The total damage per year resulting from pedestrian travel injuries amounts to about 130 Euros per person per year (roughly equal to 5% of an average employee's income or 1.4 billion Euros per year in a country like The Netherlands). Unlike motor vehicle injury accidents, most pedestrian injury accidents happen within urban areas. Fatality rates per 100,000 inhabitants vary from 3.8 per 100,000 in the safest countries (NL, SE) to higher than 14 per 100,000 inhabitants in others (PL, PT).

Most (more than 85%) of the accidents happen in urban areas on sidewalks, roadways and cycle ways. The car is the dominant opponent in pedestrian traffic accidents, but involvement per billion vehicle kilometres shows a different picture: motorcycles and busses are over-represented. The vast majority of victims are children (0 – 14 years) or elderly. The majority of severely injured the victims are elderly. Because of ageing of the population, it can be expected that this constitutes a growing problem.

Issues from task performance. Although walking is the most natural and simplest way of getting around, it still is not the case that everyone can walk without reasonable risk and trouble. Ausserer, Risser, Kaufmann, Barker, Johansson and Leden find that in complex situations the risk of being involved in an accident increases, for everyone, but particularly for children, the elderly and people with mobility handicaps. Children cannot be expected to be able to perform at the level that modern, complex traffic situations demand. Also, in some situations the task demands supersede the competences and abilities of the elderly and mobility handicapped, increasing the risk of an accident substantially. Simplification of tasks would help everyone, since this will make walking more comfortable and easy for very able persons as well. It appears that there are many options to simplify walking tasks at the strategic, tactical and operational levels. Walking should not be treated as an isolated mode of locomotion. It connects different transport modes. It is the key of inter-modality, and therefore crucial to all modes.

Determinants for strategic walking and sojourning choices. Strategic decisions regarding walking (whether to walk or not, where to walk to, when to walk) are discussed by Basbas, Konstantinidou and Moreno. They conclude that strategic walking and sojourning choices are influenced by a number of factors, such as individual abilities and competences, health, the distribution of places to go and their distance, built environment characteristics, barriers in public space, availability of complementary transport modes (like public transport), availability of information systems and other essential services that are needed along the way, security, income, education level, social barriers.

ITS support for pedestrians. According to Monterde i Bort, Johanssen, Leden and Basbas Intelligent Transportations Systems can simplify in-trip tasks while walking. It appears that there are a number of application areas: for making contact or localising, for navigation, for alerting or informing of danger, for adapting the environment to pedestrian conditions, for promoting security and for supporting pedestrians with special needs. With regard to children Intelligent Speed Adaption on motor vehicles is probably the most efficient measure to achieve a safe and independent freedom of movement for children. Cars moving at a speed greater than 15-20 km/h should not confront the youngest children.

Understanding pedestrian's route choices. Route choices are affected by a number of parameters. Czogalla provides a scientific model of the pedestrian's route choices. It is concluded that, of course, the most important determinant is distance. Other relevant quality factors are physical access: safety (safe crossing facilities, motor traffic volume and speeds), accessibility (width of sidewalks, steepness of slopes), attractiveness (maintenance of public space, lighting), and comfort (noise level, vegetation and shadow cast). Additionally there are 'soft factors' (social forces), trip purpose, personal fitness and moods. There are trade-offs between distance and quality.

Walking abilities and the identification of specific groups. In an extensive article Vukmirovic presents the main results and conclusions related to the research of functional abilities of humans and the identification of groups of pedestrians. Individual abilities and disabilities set the scene for operational walking, sojourning options and safety. In general there are four kinds of abilities relevant for walking: physical ability, psycho-motor ability, sensory ability and cognitive ability. Depending on the preconditions regarding the physical environment, social environment and transportation access, a number of special groups can



be discerned: children, adults, elderly, people with handicap, and other groups, each having their own packages of needs regarding the system. For this some concrete guidelines can be given.

The safety of street crossing. It is generally acknowledged that the safety of crossing streets and roads poses a major problem for pedestrians. In this context De Goede, Groenewoud and Van der Horst studied the human abilities and user groups related to crossing behaviour and crossing facilities. Of the severe collisions with vehicles more than half of accidents concerned crossing. Children below the age of 11 and elderly above 75 year are the most vulnerable groups. In both cases abilities and functional constraints are the dominant factor. The severity of the outcome of an accident strongly relates to resilience of the walker. The elderly are particularly fragile. Crossing facilities need to be safe, comprehensible and convenient. Since crossing a road involves a complex task, it is important to reduce cognitive load. Thus signalised crossings are generally safer than un-signalised ones. Feasibility and safety depend on the convenience of the crossing location, the volume and speed of traffic to cope with and conspicuity and visibility (from both the walker's and the driver's perspectives). Measures to reduce conflicts and conflict severity are: separation of road users by infrastructure design, improve conspicuity, speed limits and speed control, vehicle design, and driver and pedestrian education.

Public transport accessibility. Public transport can be seen as an extension of walking. Malasek proposes a method to better provide for pedestrians. Public transport attractiveness relates to speed, frequencies and comfort. A primary factor regarding attractiveness is the type of stop/station and service offered there. The walking distance to the public transport stop comes second. Next walking comfort plays a role. The attractiveness can be calculated through a formula that is provided in a dedicated article in the full report.

What can we do to improve walking and sojourning conditions? One of the distinguishing features of a system approach is that it entails a multitude of strategies and policies combined to improve the pedestrian's situation. It seldom relies on one single category of measure, discipline or strategy to achieve improvements. It covers a wide range of actors. Von der Mühl and Hanocq picture general options regarding interventions, strategies and policies that can improve the pedestrian situation.

A first step is to improve preconditions for policy development and implementation: without insight and awareness of deficits of the system and problems for pedestrians, there is no chance of any improvement. There must be willingness to improve. The organisations must be able and have the means and tools to take action. Implementation must be organised, evaluated and monitored.

The Country reports, plus professional expertise, were used to take stock of options regarding strategies and policies to improve the pedestrian's situation. Main categories of policies and strategies discerned are: Land use and transportation policies for setting the stage for making it more possible and attractive to walk, Safety policies and strategies, Acquiring knowledge to improve the quality and effectiveness of policy development and measures, Stimulating planning and action, Encouraging and facilitating walking (campaigns) and Lobbying and providing incentives or structures for making it happen.

The design of the walking environment. The key to action for the improvement of walking and sojourning in public space is design of public spaces. Architecture has 'always' played a leading role and this still is the most successful field in promoting walking. Public space designers produce tangible and measurable effects. The most important indicators for walking and sojourning quality are the amount of space devoted to pedestrian mobility, the density of the pedestrian network, the amount of streets with traffic calming, the amount of parking areas and accessibility of public transport. Important measures concern: providing for

pedestrian activities, at least based on minimal requirements for the amount of space needed; traffic calming with 'chokers' and pedestrian refuges; speed control at street crossings; street closures for sojourning activities; shielding against extreme environmental conditions (heat, wind, humidity, noise etc.); provision of seating and other useful street furniture; application of comfortable, attractive, safe and durable materials.

5. PERCEPTIONS OF WALKING

Introduction

This section relates to work² which aimed to have a closer look at the perceived needs of pedestrians, in particular to focus on the 'emotional' perspective and included the perception of walking and how attitudes, expectations and motivations influence behaviour of road users, planners, policy makers and politicians, and of walkers themselves. A practical task in connection with the discussion of user needs was to check and screen the studies that have been carried out during the last years that were dealing with pedestrian needs. One important goal was to formulate recommendations for planners and policy makers concerning how both learn about needs of different groups of walkers and how to respond to them. Not least, knowledge gaps concerning pedestrian needs should be identified.

The focus on what needs pedestrians perceive included dealing with a number of issues; perception of the different situations by pedestrians themselves; attitudes, motives and desires of pedestrians; the question which human factors influence the safety and freedom of walking; a state of the art concerning what is known about the needs and expectations of pedestrians; the question how pedestrians perceive themselves; the view of other groups like stakeholders or policy makers on the needs of pedestrians; inter- and intrapersonal conflicts in relation to their presence and movement in public space that walkers experience; the role of communication in connection with the perception of qualities and shortcomings of the sum of all preconditions in the broadest sense.

A comprehensive approach was used in order to understand the perception of physical and social environments, including the transport system, and the role of communication in connection with walking. One aim of the work was to provide assistance to the experts to decide which interventions are needed and possible to improve pedestrians' quality of life. For this, different working methods were applied including literature search, individual draft compilation of results, heuristics and group discussions.

The needs of walkers as seen from different angles

In this chapter the results of work on four sub-topics are displayed that have been carried out in the frame of the collaboration within the work; Tasks (of pedestrians) and preconditions for performing them; Perceived safety and security in the context of other requirements that pedestrians have; Specific groups like older citizens and children and their specific needs; and Higher level preconditions (meaning for instance earlier decisions like choice of living place, or activities of society in order to make walking an option). Figure 5 reflects the relationship between these topics; the decision to walk depends on how easy or how difficult walking is perceived. Then, two filter areas are introduced; the degree of safety, security, and other requirements determines whether one decides to walk or not, viz. – for people who have no other option than to walk – whether one finds walking a burden or not; different groups of road users will perceive all these preconditions differently. And finally, higher level preconditions influence the whole decision chain under all other conditions reflected in the graph:

² Working Group 2 Perceived Needs

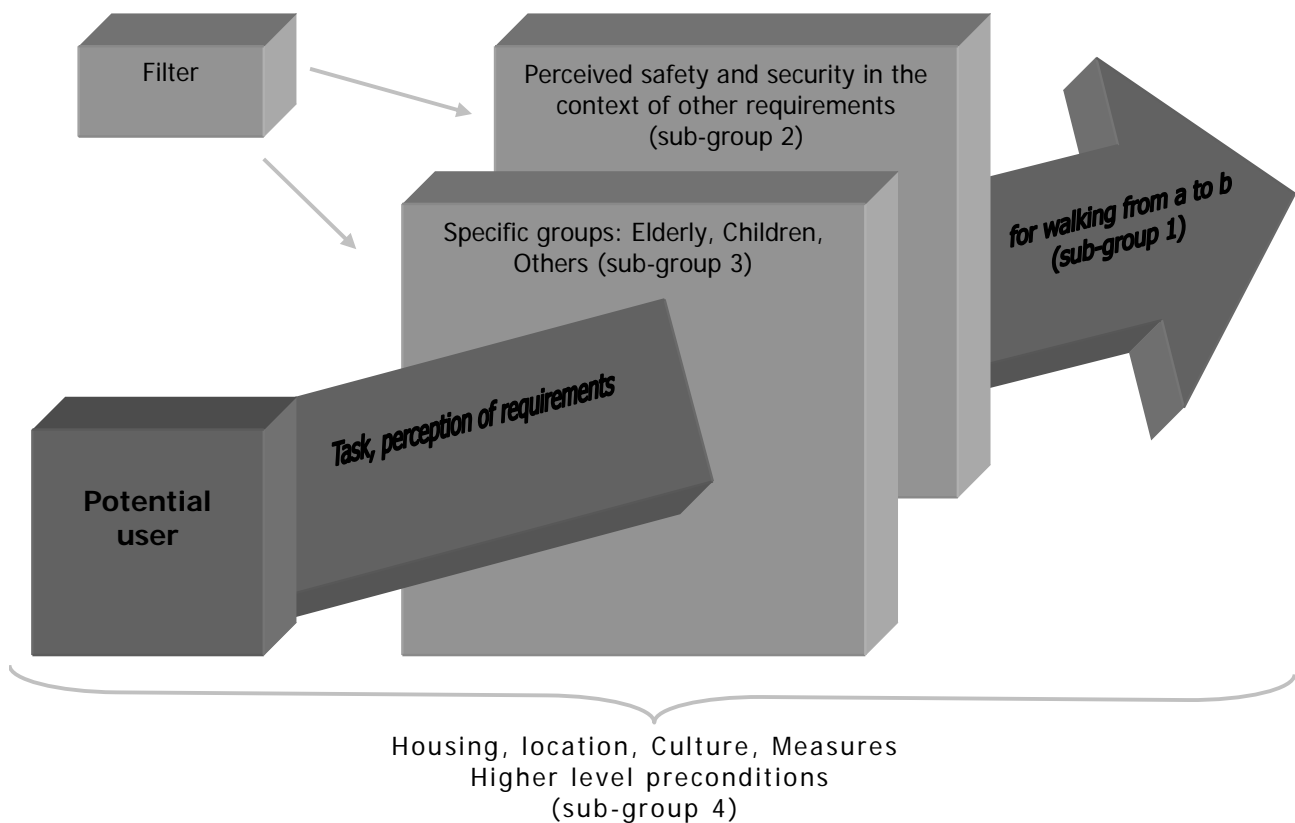


Figure 5 A walkers perceptions and characteristics which lead to a decision to walk

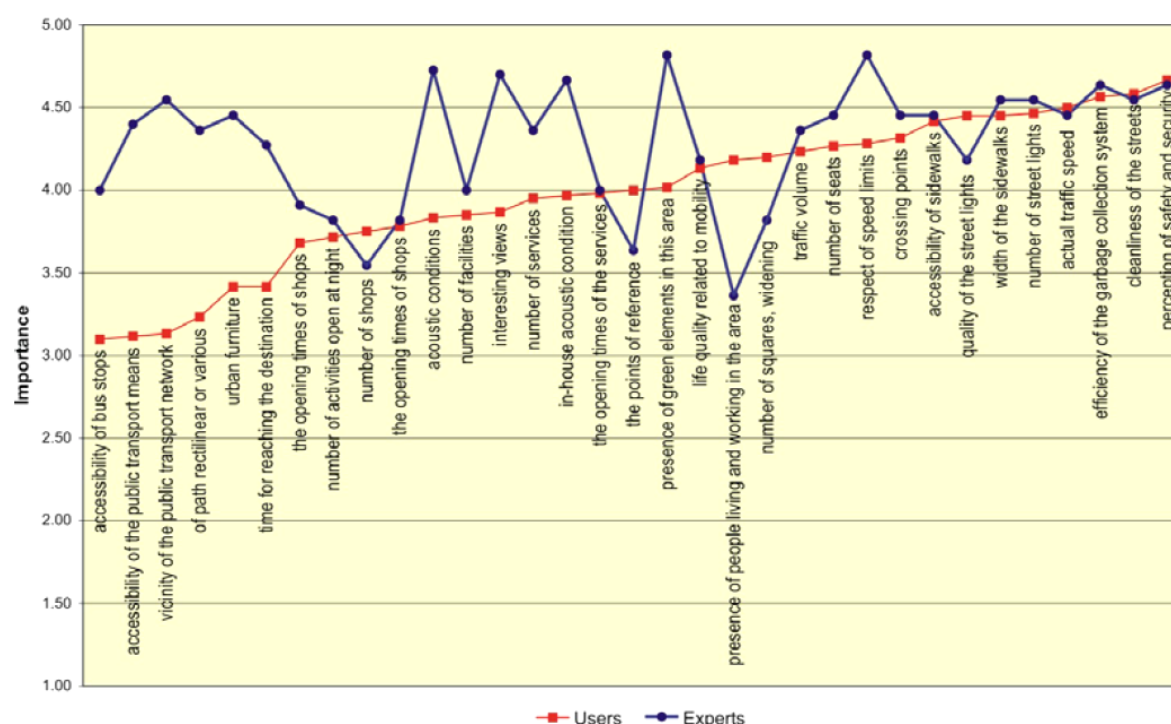
Tasks and preconditions for performing them

This sub-chapter (Kaufmann, Papaioannou, Blaszczyk, Almeida) deals with theoretical aspects and examples concerning the question how preconditions are perceived by different groups of citizens. This includes the following questions: How are preconditions like weather, the functionality of the public space, or aesthetical aspects perceived and how important are they? What tasks do pedestrians have to perform and how are these exigencies perceived? How are the preconditions for walking in general, and how in particular are safety and security in the public space seen? Which facilities and provisions are perceived to be required for performing the tasks a walker has appropriately?

For example shade matters as a walkability attribute in summer, even when age and gender differences among individuals are taken into consideration. Generally one can say that people are willing to walk for longer time when walkways were shaded in summer. Another factor is aesthetics, namely: street-side greenery. This influences the number of activities which people perform, particularly activities connected with movement (walking) and recreation and leisure. Other aspects which make walking more attractive for pedestrians are wide sidewalks, separation of sidewalks from cycle paths, good illumination, high feeling of safety (especially for children and elderly) or low speeds of cars.

It is also discussed how “other” groups (policy makers, stakeholders, planners) perceive the needs of pedestrians. Finally some analysis and evaluation methods are summarised that

discuss how one can assess, or even measure, how preconditions are perceived. One important example derived from the work of this group is that the assessment of preconditions by users/walkers and by policy makers may vary considerably; in this connection a result from the EU project “ASsessment Implementations” (ASI; Forward et al. 2005) was referred to that showed that, for instance, experts underestimate the importance for walkers, of the number of shops, of points of reference, of the presence of people working and living in the area, and of the quality of street lighting (Steg et al. 2007; Figure 6). This indicates that citizens have to be involved in the discussion of plans concerning the public space (participation); moreover, the degree of acceptance of implementations has to be analysed. I.e., it has to be analysed how implementations according to those plans are perceived.



Source: EU project ASI

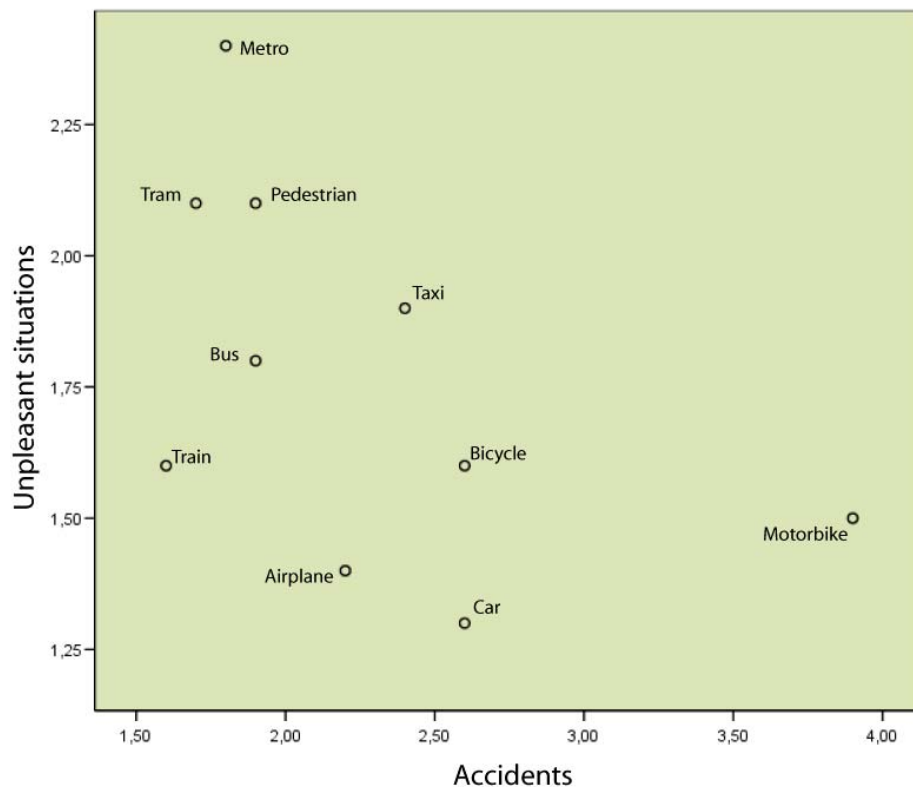
Figure 6 Assessment of preconditions for walking by walkers and by experts

The Influence of Perceived Safety and Security on Walking

This chapter, that was written by Fyhri, Hof, Simonova, and De Jong, mainly gives an overview of the influence of perceived safety and security on the decision to walk and while walking. The theoretical background as well as empirical findings dealing with these issues, are summarised. One question is for instance to what degree the physical and social environment reflect safety and security, or short-comings in this respect, and also, how behaviour is influenced by these factors. Individual habits, attitudes, and emotions, viz. individual coping play an important role, thereby.

One example that is given refers on the one hand to the negative weight of accident risk and on the other of unpleasant situations (crime, violence, harassment) one is afraid of in connection with the use of a special mode: The risk profile of ten modes of transport derived in this way is presented in figure 7. It shows respondents' worry about accidents (x-axis) and of being involved in an unpleasant situation (y-axis). The figure shows mean scores, derived

from assessments on scales from 1 to 5 (Backer et al., 2008). This study showed that walking is to a rather high degree associated with unpleasant situations as referred to above, second only to how a trip by metro is perceived. This may certainly vary from town to town, but the results tell that safety and security issues generally have the potential to function as barriers for walking. The conclusion to be drawn from this is that continuous analyses of these issues are necessary, not least in order to learn what degree of generality in importance they have.



Source: Backer et al., 2008

Figure 7 Perceived risk of accidents and of unpleasant situations (harassment etc.)

The attention within the research on risk perception has moved from cognition to the role of affect, as both aspects play an important role in decision making processes. Furthermore it is necessary to look at both types of risk that are important for pedestrians: the risk of being involved in an accident and the risk to be involved as a victim in a criminal offence, violence or threats. The feeling of insecurity tends to result in more behavioural adaptations, like changing the route.

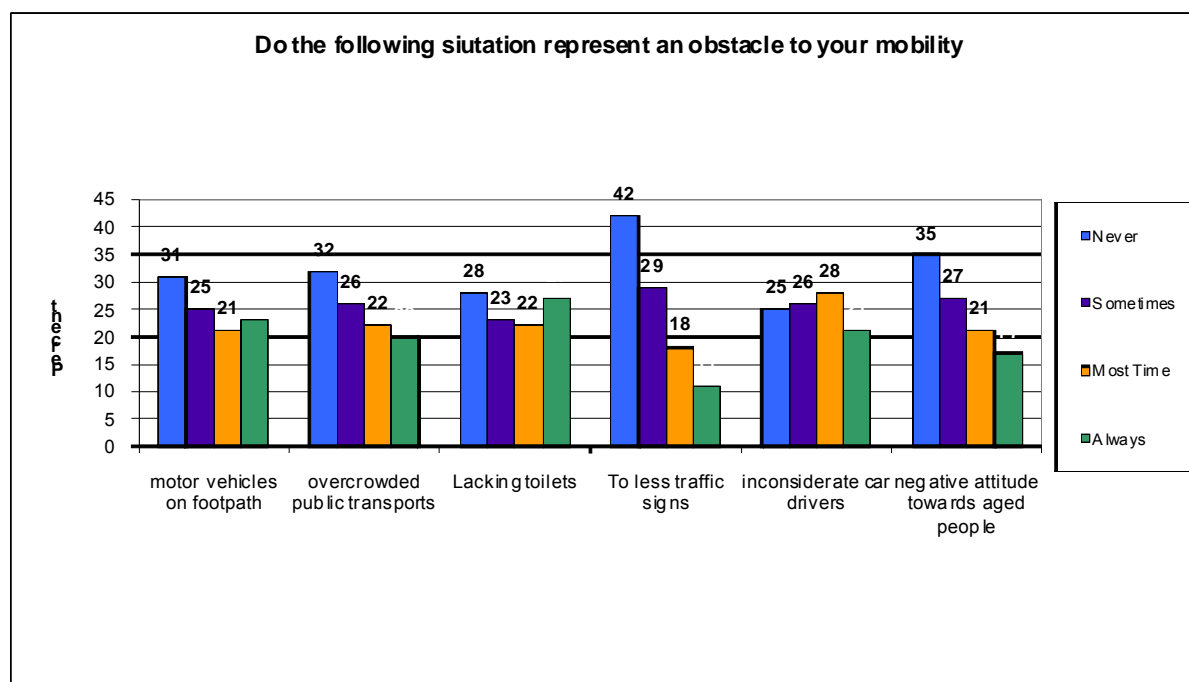
Needs and assessments of specific groups

In the literature, children, senior citizens, and people with functional limitations, and their specific needs and requirements are commonly considered. De Jong, Kaufmann, Röiivas and Rocakova summarised some relevant aspects concerning this topic.

The proportion of senior citizens will increase in the coming years. Due to modern medicine and the overall qualitative change of the modern society lifestyle more and more senior citizens want to remain active and to be involved in social and other events which increase their demands on mobility. Planners and policy makers have to take this in to consideration.

Health is a very important issue and senior citizens realise the importance of walking as an available and health-beneficial activity. Not only for fulfilling basic needs of everyday life, but mainly as an available “fitness” activity.

Here, one case dealing with barriers to outdoor mobility of senior citizens is reported. The graph below (Figure 8) shows what is considered as an obstacle by older persons. While it is specific for this group, its format reflects precisely what is needed for every group of walkers and potential walkers; to know what the obstacles for walking are, that in the case of those who have a choice may lead them to avoid walking, and in the case of those who have no choice (i.e. who have to rely on walking) decreases their life quality.



Source: Amann et al. (EU project SIZE)

Figure 8 Obstacles to outdoor mobility for senior citizens.

The group of functionally limited persons is very heterogeneous which also results in conflicts regarding their different needs concerning infrastructure. Wheelchair users have different requests on infrastructure (sidewalk without any curbs) than blind or vision impaired persons (curbs needed for orientation). The case study on multiple sclerosis patients referred to in this chapter showed that it is not possible to give a specific recommendation for this group, given existing levels of knowledge. The collection and interpretation of objective data on a larger scale is therefore desirable.

Children perceive traffic from a different angle. Furthermore they are not familiar with traffic rules and are simply not able to cope with complex traffic situations. Research on the needs of children has to take this into account. Another problem is that parents are afraid that their children get involved in an accident and in a vicious circle they decide that the safest way to take their children to school to use their car. But this causes more traffic and adds to the safety problems for those children who still walk or cycle to school by themselves. Furthermore it is shown that badly designed pedestrian crossings are more likely to cause danger to children than to improve their safety.

Higher level preconditions

Walking has been clearly evolving in recent years towards a more positive perception by actors involved in decision-making, lobbying and planning, but also how it has gained momentum as a full-fledged issue with the media and the general public. However, a lot still remains to be done in order to reach a consistent and comprehensive walking culture that gives its rightful place to both large-scale strategies and policies in order to set up a solid framework against which background to deploy a host of more concrete measures and interventions. Quite a few essential steps have already been taken by numerous cities in order to increase walking potential and its level of integration with other modes in order to achieve the goal of deploying a fully-fledged multimodal urban mobility system within their territory.

In this chapter the influence of higher-level preconditions, like housing location (Lapintie), or like societal activities to make walking visible (Lavadinho), are briefly discussed. One part of the discussion here may be summarised under the headline of "the suburban context". Issues that play a role in connection with this are, among other things, walking speed and time budget and the restrictions inherent to walking as the slowest of all transport modes. The question how these issues are related to the strategic decisions concerning the housing location is an interesting one. For instance, is the question whether one can find any services (shops, hairdressers, etc.) at all in walking distance when choosing such a location for living asked at all? In the working group the case of the Helsinki metropolitan area was discussed, dealing with housing preferences and mobility styles, and how the political, or policy, reaction to this can be described. The development of different types of suburbs as well as examples of different types of social layers in different types of suburbs, are discussed. Income, mode opportunities and mode use, and social factors (education, age, etc.) certainly play a strong role, there. In wealthy areas no infrastructure is needed when families own several cars and supply is easy by using this mode. In other areas, ground-prices may be very low so that people with lower income can afford housing there, public transport supply may be poor and car ownership restricted. Combined with poorly developed infrastructure, this may affect life quality negatively.

Generally, the discussion of walking in the urban region points out that the historical urban centre is the clear winner. It is rather limited in its dimensions, representing the original pedestrian city with some extension to the first suburban areas. There will also be more and more political support for investments for these areas, since the centre is also the main target of tourists and business visitors, as well as the preferred housing location of the urban upper classes. The situation is totally different with the suburban parts of the city which can be described as low density suburban districts of detached houses, where commercial services are concentrated in hypermarkets or "small towns" along the highways. High car-ownership and low density make it very difficult for the city authorities to provide for local public services or public transport. Thus there is very little to walk to, and walking is usually practiced only for recreational reasons. In this context, providing for pedestrian routes seems to be a side issue, but it can of course form part of a comprehensive policy against segregation e.g. through targeted measures for positive discrimination (such as providing extra funds for suburban schools and extra services for suburban centres).

Another topic dealt with within this group was of a more pragmatic character; it discussed how walking could be made "visible" and be given more weight. Thus, the paper reflects a kind of marketing process reflecting both product and communication efforts/improvements. The "slogans" carrying this idea were, among others, make walking visible and make issues concerning walking heard (e.g., see figure 6); offer trial environments; distribute information thoroughly. Moreover, consider that social factors affect walking (income, gender, age, etc.); do not forget that segmentation – e.g. considering lifestyles and associated mobility patterns

– is necessary; do not just consider the physical but also the social walker (infrastructure improvements are not enough). In connection with all these suggestions, and in addition to increased efforts to understand user segments' needs, it is also necessary to carry out systemic assessment; for instance, it has to be understood what consequences changes in one area (e.g., improved public transport) cause in other areas (e.g., walking and bicycling could increase). And not least, it has to be underlined that things need time to shift; in connection with attempts to introduce improvements in the public space one should not give up too early.

For evaluation, an important question to ask may be what people believe in. How do they look at implementations and what role does their own experience play? Good communication campaigns with media support and involving opinion leaders and peers could help to achieve critical masses of citizens supporting certain projects. When asking how interventions and measures are perceived one should refer to quantity and quality of dedicated space, to time management, to enabling elements (accessorising, virtual technologies and enhanced reality), by specifying what pedestrian-tailored access to goods and services means, etc.

Concerning policies and strategies a digitalisation is needed if one wants to know more about how they are assessed by the public. In this area, as well, just to have assumptions is not good enough. Acceptance has to be measured and there is need for accurate data and ways of measuring. With respect to this, one may assume that attractiveness, and therewith acceptance, can be increased if there is a shift in arguments from just dealing with safety to lifestyle, design, well-being, etc. At the same time, and in spite of potentially good acceptance, efficient measures for walking will not be implemented if there is a lack of lobbying. The reason is that improvements for walking usually go hand in hand with a reduction of options for car drivers. This means that allies have to be looked for and involved when it comes to supporting walking policies. For instance, synergies between efforts for improving preconditions for walking and increasing turnover of local economy should be made transparent.

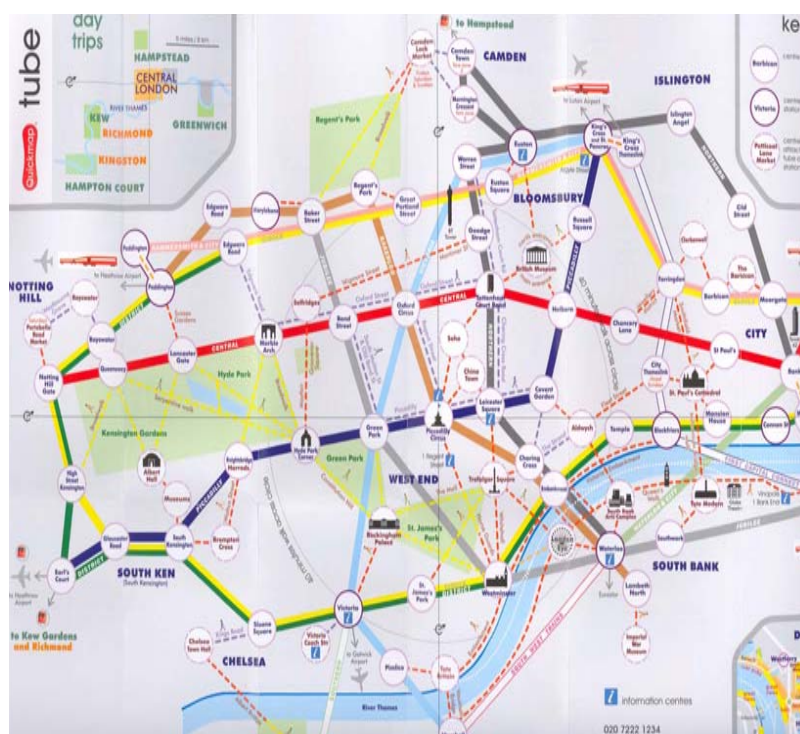


Figure 9 The Tube & Walk map for London highlights synergies between walking and public transport (Source: Quickmap, 2007)

One question in connection with marketing walking is of course which scales fit walking policies and strategies best; the agglomeration scale, suburban areas, rural roads and villages? The answer just seems trivial: agglomeration is easiest for walking where nearness dynamics function as a motor. But probably, walking can be supported efficiently everywhere by sets of integrated measures and comprehensive networks of modes. Multimodality plays an important role there, and for instance creativity with respect to introducing new technologies: This not only refers to information, but also to hardware, like new forms of public transport services, taxi services, etc. that make walking possible and worthwhile in areas where longer distances have to be covered and a walk alone can solely be done for recreation but not for fulfilling any other more practical tasks.

But as figure 9 shows, also in London, a prototype of agglomeration, a combination of modes makes clear sense!

Two other case studies reported in this working group, about Barcelona (Soares) and Lisbon (Malet), conclude that sometimes planners are weighting the needs of other groups (estate agents, city officials, architects, investors) higher than the needs of the inhabitants. Thus they do not improve the quality of life for the inhabitants (the daily walkers), but only improve the profitability of the space, with consequences for social interaction and quality of life.

Conclusions and recommendations

The conclusion drawn from the contributions and discussions in this part of the work is that it is necessary to set a regular process of making visible what the needs of different groups of citizens visible under different conditions are. To communicate with road users should become a routine. However this has to be combined with effective and efficient improvements of physical (infrastructure) and social (image and visibility) preconditions. If measures of these types are made then it will be possible to convince persons to use walking as a mode on distances that can be covered by walking, eventually also in combination with public transport, without losses in their quality of life; and at the same time it will make life, of persons who have to rely on walking because no other options are available, easier and improved.

Since quality in pedestrians movement is directly linked to perceived needs it is recommended that all quality elements for different pedestrian groups are taken into account. Regarding quality elements it was shown that streetscape elements, weather conditions, facilities and provisions like aesthetics and greenery may have great influence on peoples decisions to walk or not; these factors are perceived as essential for creating a pedestrian friendly environment. The weather can of course not be influenced, but protection against it can be provided.

As far as different pedestrian groups are concerned it was said that if specific groups are well considered (children, elderly, disabled) then this would probably be an advantage for all other groups. Furthermore the tendency of certain target groups (especially senior citizens) to overestimate traffic risks should be tackled by informing them about psycho-physical benefits of walking, together with the risks associated with sedentary life styles and motorisation.

Security issues should not be underestimated as they play a crucial role on both the tactical and the operational level. Security should therefore be seen as relevant to all parts of the travel chain day and night; the weakest link should get highest priority. However, measures for pedestrians should also ensure that objective safety is not compromised on behalf of increased perceived safety. Regarding children it was specified that any measure aimed at increasing walking and cycling safety for children will lead to more children walking and

cycling to school (instead of being brought by car) if parents believe that traffic safety is improved. Thus, all physical measures improving traffic safety need to be supplemented by communication measures.

Interventions for promoting walking are more effective when focussed at multiple levels. Therefore it was advised, firstly, to use findings from literature and empirical research about personal factors that influence individual behaviour attitudes, social norms, habits, in accordance with what marketing models ask for. You need to know your target groups before offering either recommendations or improved "hardware". Moreover, how physical and environmental factors are perceived (security, safety & aesthetics) must be studied from case to case, as well as the function of social environment factors (media, role models). These would all be parts of a toolbox for how to consider participation needs appropriately and how to react accordingly.

6. THE FUTURE OF WALKING

Introduction

“The future belongs to walking and cycling.” This enthusiastic claim by a research report written in Switzerland in 1999³ is not yet mainstream policy. In fact, the future of walking is not much of a topic at all, neither in research, policy, nor in public debates. Also “future of transport” reports rarely contain information about active modes, such as walking and cycling. This may come as no surprise given the fact that walking has been neglected by state institutions for decades.

Walking trends and visions were considered by PQN participants⁴ from many different perspectives. The report assembles 13 contributions written by 17 authors with many different professional backgrounds, living in 10 different European countries. Based on literature, inspired speculation and their own assessments, the authors lay a foundation of knowledge on which the debate can be built. They look at evidence from the past that may inform the future; they describe today’s trends and explore probabilities of change; they develop visions and investigate opportunities and threats.

Methodological approach

The participants adopted an approach in which the individual members analysed different topics chosen according to personal interest and background expertise and the group then discussed their insights. The time horizon agreed was 2030, i.e. 20 years into the future; the geographic scope of all the articles is Europe.

The publication is divided into three main parts: perspectives, trends and visions – each comprising several chapters. **Perspectives** relate to the double meaning of putting issues into a broader and longer-term context and at the same time providing personal views about some of the crucial issues for the future. This section comprises contributions by Mário J. Alves and Nicole Muhlrad about the role of energy prices, peak oil, climate change and their impacts on society; by Manuel João Ramos and Daniel Sauter about public spaces: the positive sides of improvements and their caveats; and of Rodney Tolley, Les Lumsdon and Karen Bickerstaff about experts’ opinions on the future of walking.

The section on **trends** deals with specific issues and developments relevant for walking sometimes combined with a specific geographical focus. This includes papers on: the impacts of an aging society by Iris Mühlenbruch and Barbro Rönsch-Hasselhorn; health benefits of walking by Hans and Kati Orru; leisure and tourism by Thérèse Steenberghen; and land-use, urban sprawl and urban regeneration by Emil Drápela and Karel Schmeidler.

The papers in the last section provide **visions** of what the future might be like and what we could learn from the past to create a (more) pleasant future for pedestrians. Lucia Martincigh describes the rich cultural and architectural heritage that contains a wealth of ideas for the

³ See: Netzwerk Langsamverkehr (Hg.) (1999). *Die Zukunft gehört dem Fussgänger- und Veloverkehr. Stand des Wissens, Massnahmen, Potentiale*. NFP41, Report A9, Bern.

⁴ This section relates to work done by the PQN Working Group 3 Durability and Future Prospects

future; Dragana Bazik pictures a vision of the future of public space as multiplex relational environments; and Miles Tight conceptualises the potential of reduced car traffic for walking-friendly cities.

The results of the discussions and papers are summarised in the following four main headings: A walking city is imaginable; Planning for people in a changing society; Creating inclusive public spaces in urban and suburban areas and, The crucial role of energy prices for the future of walking. These presentations are followed by Conclusions and recommendations for policy and further research.

A walking city is imaginable

Artists, philosophers, urban planners and architects have been dreaming, writing about and drawing “ideal cities” for hundreds of years (Martincigh). In most of these visions the pedestrian is the measure of ideal urban spaces. Even after passing the mid-twentieth century, at the height of love for the automobile, visions returned to cities crowded with pedestrians and bicycles. Recent high-tech visions of relational spaces use the interaction of pedestrians as the basis for highly connected information environments (Bazik).

Ideals are at odds with reality and seem impossible to be attained. This is exactly why they are ideals. Visions guide and push us to make the current state of affairs live up to our ideals. They might also be the only way to help policy makers break with current paradigms. In the near future it seems more likely that we will have to change our consumption patterns drastically: not only does our current life-style put us in danger but it will be impossible to continue once consumption in all countries reaches the same level as the developed world (Muhlrad, Alves). Some reversal of past trends and the discontinuation of past paradigms will be necessary. Most authors agree that gradual changes might not be enough to face the enormous challenges such as the ecological and energy crises.

A basic exercise in imagining urban environments that are responsive to different mobility patterns is proposed by Miles Tight⁵. This constructs three visions for 2030 from archetypal urban environments common in the United Kingdom. All three visions are based on substantial improvements in the conditions for walking and cycling. Proposed modal splits are significantly different from the reference year 2010 and shown in Table 1. Vision 1 takes best practice from Northern European cities as the model where modal split is more favourable to cycling and walking, though car usage still represents one third of the trips. For visions 2 and 3, urban environments are imagined in ways that accommodate radical changes in the present modal split. In both these visions cars will be the mode of choice in only 5% of the trips.

Table 1 Approximate mode split (trip stages) for the current situation in the UK and three 2030 visions (source: Tight et al, 2009)

	Current situation ¹	2030 Vision 1	2030 Vision 2	2030 Vision 3
Walk	28%	32%	37%	40%
Cycle	1%	13%	23%	40%
Public Transport	12%	25%	35%	15%
Car	59%	30%	5%	5%

⁵ Tight, M., Banister, D., Day, A., Drinkwater, D., Givoni, M., Guehnemann, A., Kimble, M., Macmillen, J., Miles, A., Moore, N., Newton, E., Ngoduy, D., Timms, P. and Watling, D. (2009). *Visions of walking and cycling in 2030*. Walk21 Conference, New York, October 6th - 8th.

¹ Data from U.K. National Travel Survey, 2006.

The first vision is based on European best practice with examples already existing in many urban areas, such as Copenhagen, Delft or Zurich. It assumes a moderate increase in walking and considerable increases in cycling relative to the current low base. Public transport usage would also be up, whilst car use within the urban area would have substantially declined, mainly achieved through adjustments to the amount of space available to private vehicles and the price of parking. Technical devices in the car increase conformity with speed limits and, thus, result in higher road safety. Mode segregation prevails in this vision based on a network of separate bicycle and walking paths. The third of trips done in cars still consume, however, substantial urban space and energy. Since the vision is based on best practice it follows the current trend, improving comfort and liveability but falling short of any drastic changes. The vision does not address what might happen if peak oil arrived within the next ten years as some leading experts predict and climate change phenomena became a bigger problem (Alves, Muhlrad). If this were the case, more drastic changes may occur and more severe interventions may be necessary.



Figure 10 Victorian street today and in the three visions (source: Tight et al, 2009)

Vision 2 depicts a more radical situation: Walking, cycling and public transport have increased considerably compared to Vision 1 and there has been a dramatic reduction in car use. In urban areas it is curtailed through government action and through the positive appeal of alternative modes of travel. Longer trips within the urban areas are typically undertaken on public transport. Walking and cycling increase substantially – for example most children walk or cycle to school. Land use patterns in urban areas have to change to support the infrastructure for improved public transport. To achieve the vision probably also moves towards a real-cost economy with green taxation to internalize environmental impacts are necessary (Alves, Muhlrad). For this, strong political will as well as public participation and

debate are essential. The implementation of the vision may, however, benefit from increasing oil prices. This may or may not make the transfer of large funds towards public transport, walking and cycling easier.

Vision 3 – a localised energy efficient future – attains the same almost car-free future as Vision 2 but with less help of investment in public transport. In this vision serious constraints on energy usage have rendered the traditional car virtually obsolete. Parallel developments in ‘smart technology’ have enabled walking and cycling to become the predominant modes of urban transport. Buses and trams accounting for only 15% of the modal share are restricted to segregated and direct routes to and from the urban core. Land use has changed considerably from 2010 patterns in this vision, making the cities more compact. Local, neighbourhood facilities predominate at the expense of ‘out of town’ shopping centres. Residents living within the urban area can easily travel as a pedestrian or by bicycle for the majority of their trips. Technology is the basis of this vision with proliferation of small personal mobility devices such as Human Powered/Assisted Vehicles (HPVs) and infrastructures to help pedestrians, such as moving-walkways and elevators. In a fast aging society (Mühlenbruch & Rönsch-Hasselhorn) this vision needs to be carefully laid-out in order not to leave behind substantial parts of the population that might have difficulties using active modes.

The first vision is probably largely achievable without major changes to the way in which society works (indeed, the vision is based on circumstances which largely exist already in a number of continental European urban areas). However, it will not prepare our cities for the drastic changes in resource availability that might be necessary in the next 20 years. Visions 2 and 3, if they were to happen, will require changes to society and to the attitudes and behaviour of people within society – there would need to be a willingness (or perhaps a need) to make such changes in order to bring the visions about. It is important to point out that to achieve these kinds of changes the exercise of envisioning becomes an essential part of the planning process. This suggests that the only way to face the challenges of climate change and peak oil, as well as thinking of a different society is by envisioning walking and cycling cities – this is not only possible but might become the most vital step in future urban policy processes.

Planning for people in a changing society

If we look at current trends in European societies we can make out three developments, among others, relevant for walking in the future: first, the percentage of elderly people will increase, second, health issues will become more important; and, third, leisure and tourism will continue to grow. All three fields require an adaptation of policy, planning and promotion that will favour people on foot and provide attractive facilities for spending time outdoors.

Provisions for the aging of society Societies across Europe are getting older in absolute and relative terms. The long-term impact of this demographic change on walking is hard to predict because of conflicting trends. The elderly of tomorrow will be, on the one hand, fitter, healthier and, partly, wealthier. So there is the potential that more elderly people will walk more for more years. But, compared to the present, a higher proportion will have a driving license and own a car. On the other hand, the extended age also implies that many elderly will be frail and vulnerable. Creating a walking-friendly environment is important for their independent mobility. Measures should address the fields of the built-up environment, planning processes, services and information/awareness. It is important to provide basic local services such as food stores, medical services and recreation facilities within walking distance. Traffic systems and information have to be kept as uncomplicated and as clear as possible. More shelter, seating, public toilets, hand-railings and improved lighting in public

spaces will be needed, particularly in the suburban areas. To achieve all this, participation of elderly people in the planning process is essential and should start now (Mühlenbruch & Rönsch-Hasselhorn).

Benefits of walking for health Active lifestyles have received increasing attention over the last decade and it can be assumed that this trend will continue, especially because of the contribution to personal well-being, the societal benefits and health cost savings. Based on the evidence that physical inactivity leads to overweight and chronic diseases resulting in rising health costs, there are strong arguments in favour of walking and increased measures to reduce car use. Political awareness and action will be crucial – now and in the future: gaining politicians' support is necessary to help make neighbourhoods more walkable and to increase accessibility to parks and natural areas. Creating better conditions will clear the way for more health-related walks. This has a positive effect on fitness and physical health as well as on lowering stress-levels and improving the overall well-being (Hans & Kati Orru).

Walking friendly environments for leisure and tourism Tourism and recreation are both increasingly important in our society, a trend expected to continue. Walking is part of the tourism experience and, thus, the tourism industry increasingly helps authorities to understand pedestrians' needs and influences the travel and walking patterns of tourists. However, these positive impacts also have a down-side – the commercialisation of public space being one of them. Therefore, it is crucial to find a balance between tourist needs and the characteristics of the place and its society. Aside from tourism, leisure time and recreation will remain important parts of people's everyday lives. Walking is part of this leisure time for many reasons: exercise, being outdoors, enjoying the environment, relaxation, meeting people et cetera. Environmental qualities are particularly important for leisure walking. This implies that, on top of the basic pedestrian requirements, additional qualities are needed to help people free their minds and make their walk enjoyable and relaxing. In the future, we will need more spaces that meet these conditions and are easily accessible from homes (Steenberghen).

Creating inclusive public spaces in urban and suburban areas

Three main space-related developments have been identified that will affect walking in the future: First, the concurrent trends of urban regeneration and continued urban sprawl; second, the upgrading of public spaces with some adverse effects of gentrification and social exclusion; and, third, the need for public space design to include insights from the past and analyses of current societal characteristics.

Land-use development Two simultaneous trends in land-use are taking place: a continued suburbanisation and the urban renewal of many city centres. The degrees of both differ across the European regions depending on economic and demographic developments. Besides economic pressures, urban development is shaped by three lifestyle-related trends: (1) the continued increase of living, working and leisure space per person, (2) the decrease in average household size, and (3) the desire to live half-way between country and city (Drápela, Schmeidler). This urban development is characterised by a social divide. On the one hand, there are high density suburban areas, usually made up of large apartment buildings for lower class populations where car ownership is below average and people are often dependent on public-transport and/or forced to walk in everyday life (so called 'captive walkers'). On the other hand, there are low density peri-urban settlements with mostly detached housing, often several cars per household and occupied by middle and upper class

persons. Walking here is mostly done for leisure purposes. Special attention is needed for the first group in the future. Given the usually poor walking conditions, an aging society, and the likely rise of fuel prices in the long-term, these people will be highly vulnerable. The lowering of distances to amenities plus the improved supply of goods and services will be as necessary as better walking facilities and public transport (Muhlrad).

The trend of re-urbanisation has been triggered by middle class people and well-to-do professionals moving (back) to the city, often to upgraded old neighbourhoods or to newly developed former industrial sites in the centre or along river-, lake- or sea shores. Public spaces are often upgraded as well, making these neighbourhoods inviting for people to walk and spend more time outdoors – a trend likely to increase (Sauter). However, the upgrade of neighbourhoods also leads to higher rents for shops and apartments, forcing lower-income people out of central areas into the suburbs with bad walking conditions. With the city administration's one-eyed focus on the centre – often supported by pro walking activists – these pedestrians and their fate are forgotten (Ramos).

Both suburbanisation and urban renewal have one factor in common: the growth of car ownership, car use, road network expansions and the number of parking facilities. In the centre these infrastructures are built underground, in the suburbs they are above ground, segregating communities for people on foot. The reason for this development is that politicians, in trying to pursue sustainability yet retain the support of motorists, have been routinely peddling the mixed messages that *car ownership* should increase but *car use* should decrease. A consequence of this is that though there are many splendid examples of revitalised, pedestrianised town centres where walking is attractive and popular, these 'green' gains are set in a sea of 'red' losses elsewhere (Tolley & Lumsdon & Bickerstaff).

Use of public spaces The use of public space is changing based, among other things, on the sustained increase in the popularity to stay outdoors, a recently acquired tradition in Northern Europe. There are a number of reasons for this, three are mentioned here: (1) Good quality public spaces have been discovered as economic assets. Pleasant walking atmospheres attract shoppers, tourists and investors, thus, creating business opportunities (Sauter). (2) The authenticity and atmosphere of public spaces counter-balance the isolating living conditions and virtual worlds of people's everyday lives. With the flexibility of working hours and the introduction of mobile phones and other devices, public space becomes a place of multi-purpose activities (Bazik). (3) For tourist destinations, the economic revenue generated by pedestrian visitors is a stimulus for improving public space (Steenberghen).

Changes towards better design in public spaces and attractive conditions for walking are welcome. But there are also dangers looming such as creating monotonous streets, over-commercialising the city, socially excluding disadvantaged people and gradually pushing low and middle-class residents out to the suburbs. Social conflicts can be the result of these processes of gentrification, privatisation and commercialisation. The high density of use leads to an accumulation of waste, noise problems and vandalism. Surveillance with video cameras and private security firms is usually the response by the administration. Together with the commercial interests to keep the city clean, surveillance often leads to the displacement of so called "undesired" people, such as homeless or begging people.

These social conflicts can be expected to increase in the future with the rising popularity of public spaces. New policies are needed to strike a balance between the positive and negative aspects to guarantee that every person can use the space freely. It is also important that the specific qualities of suburban public spaces be developed so that local residents can spend their leisure time there instead of having to migrate to the city centre. Public space should be seen not only for its economic but also for its social integration potential.

While the role of the car in the city centre will be further moderated in the future, there are new conflicts for space appearing. The expected increase in the use of motorcycles and mopeds may adversely affect pedestrians. Similarly, faster electro-bicycles ('pedelecs') and other devices, such as segways and scooters, may create new problems in terms of safety and space allocation. Finally, high speed public transport corridors (e.g. Light Rail or Bus Rapid Transit systems) may cut pedestrian networks apart, after traffic calming had just re-connected them. The challenge will be to manage the limits of space by moderating speeds, re-conquering more space from cars, and achieving a space allocation that allows for safe, unobstructed mobility for pedestrians (Alves).

Design of urban spaces Design and planning paradigms for urban public spaces appear to have changed in a number of cities. While the "predict and provide" paradigm as a self-fulfilling prophecy for more car traffic is still used on the national level and in many suburban regions, there is a shift towards providing more spaces for people in the city centres. Accessibility becomes as important as mobility, and area-wide planning is being introduced in addition to single interventions. To accommodate pedestrians' needs, route-planning (borrowed from the car paradigm) is combined with place-making, meaning that provisions for linear movements ('links') are just as important as places for people to stay ('place') (Alves, Sauter).

For centuries, urban planners and architects have developed visions of ideal urban environments. One common thread is the pedestrian as the measure of the quality of the space. Squares and streets were always imagined bustling with people walking, trading or talking with each other (Martincigh). It is necessary to learn from these visions for interventions in the future. The adaptation into adequate forms for the suburban context will be one of our major challenges.

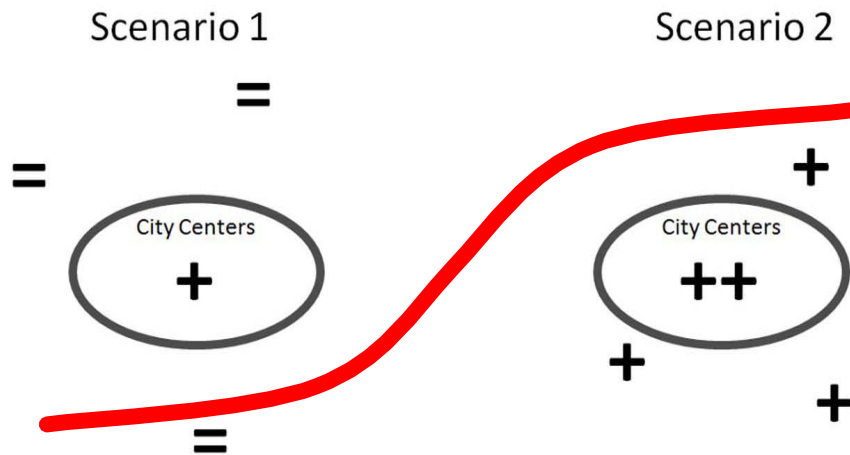
Successful design builds on the present societal context. The still-expanding information society creates new perceptions of and conditions for the design of space, with the effect that operational issues become just as important as physical aspects. The relationships and interaction between people and the built environment will be increasingly defined by communication and negotiation. The spaces themselves become relational. This means they are hybrid, multiplex-layered, with several activities happening in parallel, where work and pleasure mix (Bazik). In the future these elements will have to be considered in depth and amalgamated with the ingredients known to make great public spaces.

The crucial role of energy prices for the future of walking

Energy prices have always played a crucial role in human mobility and the shape of settlements. Eras of cheaper energy have usually been the forerunner to the fast increase of car ownership, desertification of urban centres and lower density suburbanisation (Drápela). Phenomena such as urban sprawl increased during certain periods of the last century when oil prices declined (Sauter) showing that transport demand changes, albeit slowly, in response to the price of energy.

Two contrasting short-to-mid-term scenarios are introduced by Alves: **Scenario 1** describes a business-as-usual approach, with cheap, private motorised mobility, a lack of political courage to implement real-price economics, and a reliance on techno-efficiency. In this scenario, there would be a continuing trend of increased urban-sprawl and motorised trips (with either fossil fuels or alternative energy vehicles) and a resulting decrease in walking.

Scenario 2 describes the consequences of a sharp increase in the price of motorized transportation. This may result from peak-oil, carbon taxes, sharp increase of carbon in emission trading prices, and/or generalised road pricing. In this scenario, the increasing cost of private mobility would lead to a gradual trend to more compact cities, decreased growth of individual motorised trips and consequently, more, walking.



Real price of individual motorised mobility compared with today's prices (in city centres and outside of city centres):

= reduction or remaining approximately the same
 + increase
 ++ sharp increase

— change in the amount of walking

Figure 11 Medium Term Scenarios: price of individual motorised mobility (source: Mário J. Alves)

Petrol prices are crucial to the future of transport systems. High prices during the next decade will accelerate the conversion to smaller conventional, hybrids and full-electric cars or, in the long term, maybe hydrogen cars. The proliferation of full or partially electric cars will be a mixed blessing for pedestrians. There will also be tremendous legislative pressure to allow Personal Electric Vehicles (like Segways) to be used in all forms of public space – on roads, pavements, indoors (transport interfaces, university campus, hospitals, airports, and so on). There will also be pressure for legislative changes for their usage by young people. The ubiquity of these devices will mean an acute decline in walking. The competition of these devices for space with the pedestrian, their short range and low speeds will be more attractive to pedestrians than to car drivers, especially in a context of increasing urban sprawl (Alves).

For the long-term (2050 and beyond) three possible post-car out-comes will impact walking in different degrees: the 'local sustainability' scenario, 'regional warlordism' and 'digital networks of control'. In the first scenario more equitable and environmentally responsible societies are conceivable, if the right policies are implemented now. Regional Warlordism, the second scenario, would see the breakdown of the state as we know it. More subtle forms of Regional Warlordism can be imagined in western societies due to the proliferation of organized crime, high security closed condominiums, deep social inequalities with flares of violence. However, the third and most likely scenario will be different forms of Digital Networks of Control, where highly technological societies are regulated by more or less authoritarian regimes, depending on energy availability. Pedestrians will clearly be the losers in the last scenarios, having to face an undemocratic society or the aggressive use of public space by some groups. Back-casting, sustainable communities and healthier walking are more likely to be attained if the right policy decisions are taken now (Alves).

Two more contrasting scenarios similar to the two of Alves are presented by Muhlrad: the “doom scenario” and the “optimistic scenario”. The promotion of walking for Muhlrad is an essential policy element to avoid the “doom scenario”. In her view this scenario will bring with it increased social inequalities, poorer life quality, economic slump, deteriorating health and rising violence as a result of higher petrol prices and climate change. It is crucial that policies to promote walking be implemented now, since the current trends suggest that negative impacts will arise in the short-term rather than in the long-term.

The “optimistic scenario” implies that walking will be performed on a daily basis, as an independent transport mode or combined with public transport, by a larger share of the population, for longer trips and a longer time than now, with ample possibilities for stopping on the way and sojourning in the public space. To bring this situation about, walking has to be perceived by the citizens as desirable, useful, practical, safe, comfortable, interesting, and compatible with other activities and daily chores (Muhlrad).

Both authors point out that to avoid the worst case scenarios, taxpayers’ money will have to be invested in re-developing parts of urban areas, expanding public transport and re-designing streets for safe and comfortable bicycle and pedestrian traffic. It will also be crucial to internalise the impacts of private transport by increasing its price. It is, therefore, easy to conclude that the public money essential for the “optimist scenario” can be obtained from the taxation of private mobility.

This obvious strategy might face strong opposition from car drivers and road transport business. Direct transfer from road or fuel tax to alternative modes of transportation could make this policy easier to implement and more acceptable to taxpayers. Fuel prices will most probably increase in the next few years; if this increase is due to tax collection it will be possible to prepare the ground for the necessary modal shifts. If, on the other hand, the price increases result from peak oil, the shift to cheaper transport modes will be painfully forced on people.

However, the path to real-price economics applied to transport systems will be difficult and therefore slow. Excluding urban road pricing, real-price economics will be controlled by central governments. Hence, for local governments and city political managers, it will become more acceptable to increase the efficiency of demand for modes that the policy vision wants and reduce the efficiency of the supply that induces the demand that the policy vision does not want. This shows that for policy making to attain these long-term objectives, a shared vision of the future will be increasingly important - hence, the importance of the involvement of politics in transport and mobility planning and management. It will become clearer that the phenomena of induced demand not only affect car usage but also work in favour of modes the policy maker wants to encourage. The same way pedestrians “evaporated” throughout the Twentieth Century by the reduction of their space, favouring safety and comfort of public space will be increasingly understood as a possibility to reverse this trend and induce pedestrian demand.

Walking is the solution: conclusion and recommendations

Over the past 100 years, walking has been erroneously defined as a problem standing in the way of progress. However, walking is the solution to many transport-related problems and, thus, represents progress. The benefits to the individual and to society are obvious when considering the challenges of climate change, health problems, peak oil and raising energy costs, the impact of financial crises and the survival of the local economies.

The crucial element is that we have to act fast – act now. The sooner walking and public space improvements are implemented and established at the core of national and local transport, environment, health and social inclusion strategies, the greater the benefits to be reaped in the future. Measures for improvement must be an essential part of the overall framework of urban development, so that unsustainable trends are not concealed by a few cosmetic measures taken for walking. The future will demand even better management of the limits, be they environmental, economic-, resource- or space related. Walking provides the answer.

Requirements and opportunities for professionals and policy makers

To create a walkable city, it is helpful to have bold visions. It is both imaginable and possible to achieve a high modal share of walking and a low share (e.g. 5%) of car use. Once this vision is set, the necessary steps have to be defined to reach this objective. The following elements are important requirements for professionals and policy makers on all levels – from small communities, to larger cities right to the national and international government levels:

- Put pedestrians at the centre of your vision and at the top of the hierarchy of transport modes. Think beyond the myths and traditional arguments. Political will and choice are crucial to create a positive public atmosphere for debate in which good walking policies and an appropriate institutional framework can be established.
- Be clear about your vision. Advocating reductions in car-use while still supporting the increase in car-ownership, the building of new roads and parking (often termed as ‘relief’ or ‘pro-economic’ measures) is not compatible with the vision to support more walking and sojourning. Creating conditions which enable people to reduce their car-dependency has to be closely linked to pro-walking policies.
- Get the prices right: the internalisation of externalities of all transport modes, such as pollution and accident costs, by introducing a true-cost approach is one of the best supporters of walking since the latter is the most cost-effective, low resource-using, non-polluting, efficient and equitable means of transport.
- Create awareness and recognition of walking within the administration, among professionals, and the wider public: look at pedestrians and their characteristics, their needs, abilities and longings as a basis for the promotion of walking.
- Collect good data about walking and public space: data is one of the most important pre-requisites in order to make the right choices for the future.
- Provide for ‘link’ and ‘place’: Pedestrians require not only high quality linear connections between origin and destination but also attractive public spaces where they can linger, play, interact and enjoy their surroundings.
- Adopt an area-wide approach. Do not limit interventions to single locations but plan comprehensively across neighbourhoods and across the city and its conurbation.
- Look at the best examples from the past and today. For centuries good solutions have been implemented in many places all over the world. Integrate the insights from the past into today’s societal context. It’s not technical problems but often the lack of awareness, openness and political will that stand in the way of improvements.
- Upgrade urban spaces but be alert to its social implications. Public space is the centre of opportunity but also of potential conflict. While positive economic effects are welcome, measures are needed to avoid over-commercialisation and subtle privatisations with their gentrification and social exclusion effects.
- Focus on the suburban areas as much as the historic centre. Due to urban sprawl the most dismal walking conditions are found in the outskirts. With the looming increase in energy prices and the aging of our societies, special attention has to be given to the walkability and creation of meeting places on the periphery. Distances to provisions have

- Provide for all, the minority as well as the mainstream, the ‘average’ as well as the ‘extremes’. Walking, by its inherent character as human transport mode, requires facilities for a broad spectrum of users and uses: for the disabled as well as the fit, for the old as well as the young, for the poor as well as the rich, for the healthy as well as those wanting to improve their health, for long-distance as well as short walking trips, for long-term residents as well as newcomers, for locals as well as tourists.
- Be aware of new challenges in terms of space allocation. While car-traffic will tend to be further moderated in most cities, new challenges are arising from ‘friendly’ transport modes, such as electric bicycles, electro-scooters and high speed public transport systems. New safety challenges may also arise from the wide-spread introduction of electric cars.
- Build on the most promising arguments to promote walking: the economic, health and social benefits of walking. They have been widely documented. Cultural approaches may still be an untapped resource. Support is needed by creating the right conditions, so that these initiatives can unfold.

Recommendations for further research The Pedestrian Quality Needs (PQN) project allowed for exploring some future trails. Many questions remain unanswered, however, and a more systematic analysis of the aspects already discussed is necessary. It is recommended, thus, that the following issues are followed-up in some suitable way in the future:

- To develop and apply appropriate methodologies to look at the future of walking and living space, e.g. based on Delphi surveys, forecasting and/or back-casting techniques.
- To analyse systematically the impact of social, economic, technological and ideological changes in walking policies based on interdisciplinary views and cultural differences.
- To assess the impact of restricted accessibility, social inequalities and social exclusion on people’s lives in relation to their living conditions and mobility needs, particularly on foot.
- To explore the intervention possibilities in suburban areas to improve walking conditions, taking into account the different types of settlements in the periphery.
- To research and investigate how the impact of different developments can be assessed based on quantitative and qualitative indicators and methods.

A range of possible formats come into consideration, for example, the international research collaboration within the European Framework or Regional Programmes (e.g. URBACT, INTEREG); the collaboration between larger international bodies, for example with WHO, the World Bank and UNICEF or other UN-Organisations on “What walking can do for society” addressing the social inequalities and global economic effects on local walking, contributing to intercultural capacity building; or the start of a new COST Action, for example, one on “The Future of Mobility and Sojourning” which would include all transport modes but with a special focus on walking.

7. POLICY PROCESS

Overview

Current policy does rarely properly supports walking and sojourning in public space and the PQN Project was founded on the principle that ‘we ‘can do better than that. It was assumed that a comprehensive system approach to the issue, similar to state of the art strategies like ‘Sustainable Road Safety’ (Wegman et al, 2005) and the ecological approach to health (Sallis et al., 2006), would offer a better alternative. Furthermore, it was assumed that the best way to improve the pedestrian’s situation, is to start with the needs of the pedestrian, deal with the issue separately and see what is best from that perspective. Combining supportive policy strategies with regard to the environment, health, road safety etc., and integrating the support of walking and sojourning with other policies from the start, have been seen to produce sub-optimal results for the pedestrian.

This section provides a summary of the Projects⁶ attempt to integrate the different perspectives discussed in previous chapters and develop a direction for policy and future research recommendations.

The conceptual framework

The PQN Systems Approach is not so much about solving problems, but more about improving the quality of the pedestrians’ environment by implicitly dealing with current and foreseeable future problems.

A Systems Approach not only covers the *content* of the issue, but also the process of change towards improvement and the nestling of the interventions and processes in a wider *context*. In each step in this process the content should cover all relevant elements within the pedestrians’ system. At the end of the process the impact on the ‘outside world’ of promising interventions, measures and programs is evaluated; at that stage fine-tuning can take place to improve feasibility, effectiveness and efficiency of proposed changes. The steps are displayed in Figure 11.

The pedestrians’ system is seen as a stratified system. At the most abstract level it features 4 elements: the environment, the pedestrians’ system, input (=intervention) and output. On the next level it also features 4 elements, namely the pedestrian, the social environment, the physical environment, transportation and their interrelations. On the concrete level quality determinants in relation are pictured. The pedestrian’s behaviour and performance are determined by needs, opportunities and abilities.

The benefits of the PQN systems approach are believed to be:

- In principle it covers all options
- It will offer best value for money
- If properly done, it will improve the image of the field.

⁶ This section summarises work done by PQN Working Group 4 Coherence and Integration

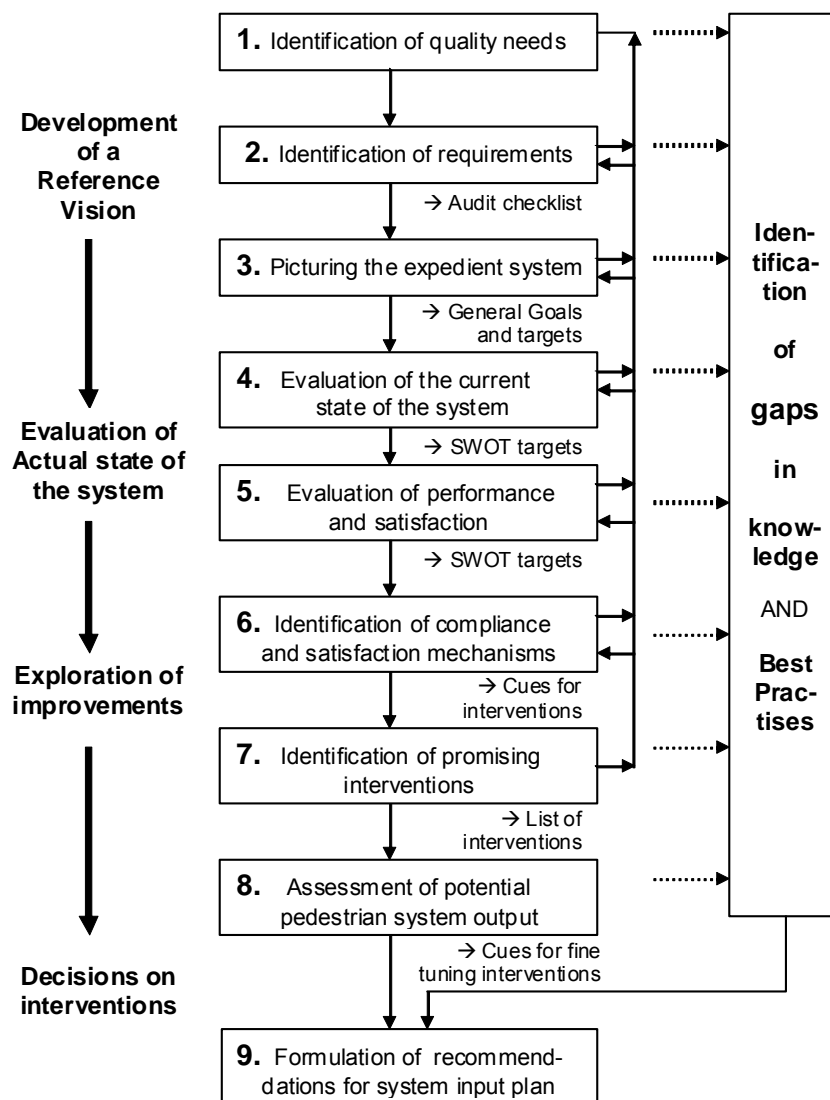


Figure 12 (Sub-)steps in the pedestrian quality policy process

Policy process development

Identification of Needs Discussions led to three papers relating to the identification of needs. It was found necessary to work out conceptual analysis of needs. The paper 'The concept of needs' by Kimmo Lapintie reflects this analysis. It pictures an analytical construction of the concept of needs, based on conceptual analysis of the existing literature in various research fields. The various needs of pedestrians that Lapintie (2008) distinguishes are summarised in Table 2 Classification of needs.

Ralf Risser and Christine Chaloupka took a different perspective. They summarised basic theories and definitions of needs from a psychological perspective as well as empirical studies on the issue. Their paper starts with definitions of needs. A major issue is that a need concerns something that is necessary for survival, whereas a want is simply something that a person would like to have.

Table 2 Classification of needs (Lapintie, 2008)

Type of need	Definition	Relevance and problems
Homeostatic/subsistence needs	Necessity of the human physical system to maintain a set level of temperature, nutrition, activity, etc.)	Provision of shade, shelter, resting places, public wells, restaurants and cafeterias, safe crossings, etc.
Psychological needs	Necessity to reach e.g. relatedness, competence and autonomy in order to live a satisfying and meaningful life	Provision of accessible public and community spaces for meeting and communication, clear orientation and legibility, necessary control to ensure personal security.
Aesthetic needs	Preference for well-designed and/or meaningful cultural products and natural environments, can be refined through education and acquaintance with the arts	Provision of well-designed urban space, good materials and street furniture, scenic environments.
Social needs	Necessity of social groups to communicate and cooperate, as well as form social distinctions.	Provision of accessible public spaces for meeting and communication, clear orientation and legibility.
Public/political needs	Facilities and services that are considered citizens' rights that the political system is committed to. Disciplinary control/subjugation.	Provision of high-quality and accessible public spaces and public services, public transport, affordable and accessible housing, personal security, freedom to use public space within limits.
Source: Kimmo Lapintie: The interdisciplinary Concept of Need (note for WG4 10-11-2008)		

Literature offers many theories on needs. One of the best known ones is from Maslow on the hierarchy of needs. Other important contributions to theory were Alderfer, Gasiot, Graves, Hofstede, Early and McClelland. Currently there is (some) consensus that needs are not so much structured in a hierarchical way, but that they interact. Needs relate to values, as values are assumptions and feelings of what is desirable. Sometimes specific needs will conflict with other needs, and this is often the case with individual and life-quality needs (collective needs). Following Hakamies-Blomqvist (WALCYNG project) Risser & Chaloupka distinguish eight types of needs. For each of them they provide indicators. The eight types of needs, that Risser & Chaloupka distinguish, are:

1. The social values and motives (contracts, relationships, transactions)
2. Health aspects, the provided comfort ('easy to walk')
3. Comfort
4. Weather protection (against rain, sun, snow, wind)
5. Safety preconditions (reflecting most of all *feelings* of safety)
6. Mobility (meaning the given possibilities to be mobile spontaneously)
7. Aesthetics
8. Interoperability / useability.

Lapintie's conceptualization and Risser & Chaloupka's practical indicators served as input for the third source paper, by Rob Methorst, on the Identification of needs. Methorst argues that a logical way to support walking and sojourning in public space is to start with the identification of the pedestrian's needs and abilities. The main aim of the identification of pedestrian needs and abilities is to provide a valid, suitable and convincing ground for stipulating requirements for pedestrian facilities.

Basic pedestrian characteristics and abilities set the stage for pedestrian needs:

- Heterogeneity: almost everyone is or can be a pedestrian; individual needs and abilities to satisfy them vary from person to person
- The dimensions of a pedestrian: takes approximately 0,5 square meters of space, much less than other modes
- The walking average and maximum speed slower than (almost) all other modes
- The action radius of a pedestrian: less than other modes; depend on personal abilities
- A pedestrian not only walks, but also sojourns in public space
- A pedestrian is relatively vulnerable; they are not protected by a vehicle's structure.

A guiding principle for the identification of needs and stipulating requirements is Design for All, which postulates that it is most opportune to start from the needs of persons that do not have a choice but to walk and the persons that have most difficulties walking and sojourning.

The same basic needs can have different appearances on the four optional pedestrian activity levels: lifestyle, strategic, tactical and operational activity levels. At the *lifestyle* activity level preconditions for walking and sojourning are defined. Information, proximity of relevant destinations, to feel at home, independence, social activities, free use of public space and equity are the dominant pedestrian needs. The conditions must be Convivial, Convenient, Connected, Conspicuous and Comfortable (the 5 C's).

On the *strategic* activity the same fundamental needs apply, but they are more concretely felt at temporary conditions and related to timely availability of opportunities. There is a difference in experienced needs between daily trips and new and incidental trips to unfamiliar grounds. For the latter certainty about conditions under way is a most relevant need. Aesthetics play a role in on-the-spot choices.

Identification of requirements The policy development step of Identification of requirements is substantiated by Jürgen Gerlach through his prolusion of a requirements checklist, as a practical tool for policy development, focussed on walkability and PQN inspections. The tool consists of detailed questions on features that support walking and sojourning in public space. It is meant as a first draft of a requirements guidelines and recommendations regarding pedestrian issue policy development, the physical environment, transportation and services to support walking and sojourning in public space. As there still is very little 'mature' information about non-infrastructural aspects and strategic policies and services for pedestrians, walking and sojourning, these issues need to be substantiated in future projects.

Insight in the pedestrians' needs and abilities is the key to successful improvement of the system. No knowledge and insight means no awareness, which in turn implies that it is improbable that improvement action will be planned and implemented, meaning that unfavourable conditions will sustain. Therefore the first precondition for adequate support of walking and sojourning is to have adequate system knowledge and issue awareness at the policy development and decision making levels. This means that data availability, research and development are critical requirements. Education of key players in the field is essential. Other critical preconditions are willingness to support walking and sojourning, the internal and external organisational structures of the relevant stakeholders that control the system, the maturity of their policy on the pedestrian issue and the functionality of the prevailing legislation, procedures, guidelines and rules.



Evidently there are practical and political limits to establishing such a fundament. When everything possible is done to create optimal preconditions for policy making it is time to look at the options for improving conditions at the lifestyles activity level: management of travel and sojourn needs, abilities and opportunities, land use structure planning, land use development planning, road network classification, upgrading behavioural laws and rules, education and communication on optimal choices at the existential and strategic activity levels. Requirements of this order set the stage for visible, tangible and concrete facilities and services for walking and sojourning and relate to tactical level facilities and services, like network characteristics, traffic rules and enforcement, vehicle regulation and traffic management. These criteria describe the traffic flow. Examples of this order of requirements are: public transport (relevance and schedule), speed limits, traffic lights, etc.

When there is a functional structure for concrete facilities in place, it becomes opportune to define requirements regarding visible, tangible, concrete facilities and services for walking and sojourning. This order of requirement concerns the equipment of pedestrians, contact options of the social environment, design and equipment of public space and the availability, design and equipment of the transportation system. Here requirement specifications concern pedestrians, vehicles, the physical environments and elementary operational behaviour of other people (including other road users) in the environment as well as concrete opportunities for pedestrians to perform intended activities. Examples of this order of requirements are: speed limiting measures, pedestrian crossings, conditions of surface, other designs of roadside elements and also the equipment of roadside elements.

Since macro level interventions set the stage for the functioning of the system on the lower activity levels, it is sensible to start the intervention program development with looking at the practical options for intervening at the macro level, then deal with the meso level and finally with the micro level. This is called the Cascade principle (Methorst, 2000).

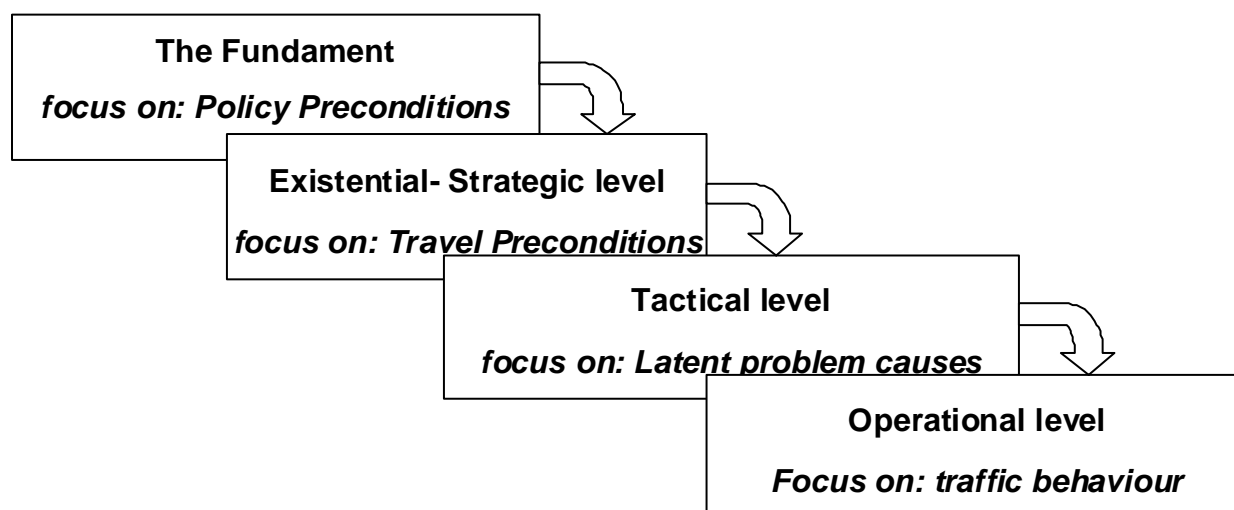


Figure 13 Cascade of interventions principle (after Methorst, 2000)

Picturing the expedient system Obviously, a list of requirements with regard to specific items does not suffice as a reference framework for policy developments and proper evaluation of interventions for the support of walking and sojourning. Some requirements are more important than others; some of the specified requirements may conflict with more general ones and vice versa. Requirements point to desirable qualities of the pedestrian's environment or pedestrian competences and abilities. Such qualities relate to usage, specific situations, cultural contexts etc. In the 5th contribution (section 6.7), by Hector Monterde and

Diego Moreno (titled 'Assessing the importance of qualities'), ideas on ranking qualities are presented and discussed: 'to what extent do qualities of the pedestrian system reinforce the objective and subjective preconditions to fulfil the pedestrian needs?'. Monterde and Moreno find that there are a number of relevant perspectives regarding rating of importance of qualities. As such they identify:

- *the Bradshaw typology*

Bradshaw (1972) distinguishes 4 categories of needs: 'normative needs', that are defined by professionals, 'felt needs' that are equated to what people want, 'expressed needs' that are generally seen as 'demand' or 'un-met need', and 'comparative needs' that are measured by reference to facilities and services that are available elsewhere. The categories cover different grounds and have their own limitations. Rating according to this typology can lead to qualifications like 'real need', 'no need at all' and 'inconclusive'.

- *the hierarchy of Walking Needs* (Alfonzo, Hagen, Maslow)

In this type of rating some kind of hierarchy is distinguished, whereas some qualities are more fundamental than others. The most basic quality is mobility or feasibility. Pleasurability or attractiveness are the least important qualities. In between come accessibility, safety and security, reliability, comfort and convenience.

- *Demand on the physical environment* (Gehl)

With regard to outdoor activities Gehl (2006) distinguishes 'necessary activities', that will be performed whenever possible, 'optional activities' that depend on what a place has to offer or how people behave and feel about it and 'social activities', that will only take place when there are other people in the environment.

- *Multiple Categorization Concepts*

This type of rating procedure can take advantage of several rating concepts by combining them and putting them in a matrix. What the matrix will look like will depend on the input received.

Within the context of the project it was not yet feasible to provide functional and consistent guidance for the development of dedicated Reference Visions.

Evaluation of the current state of the system The third frame of the policy development process concerns the Evaluation of the Actual State of the System. Within the Project this issue was broken up in two parts. The first part deals with how well the pedestrian's environment and the conditions and opportunities that are actually offered, comply with the quality requirements as they are identified in the vision, in guidelines, legislation, and policy statements. This part is reported by Nicole Muhlrads, titled 'Evaluation of the current system'. As this activity relies heavily on the maturity and consistency of the available material on requirements and even more the availability of information on the current situation with regard to the specified requirements, and such information is quite scarce, the paper can offer only expert opinions and suggestions that cannot yet be based on firm scientific evidence.

At the national level the position of the pedestrian is defined by knowledge and knowledge management, media attention and policy frameworks that affect walking and sojourning. Legislation and formal policy statements in policy papers as well as the means available on the national and local levels (including the organisational structure, education of professionals, road user education and training, and promotional activities) set the scene for the improvements.

A large variety of stakeholders are involved in policies with an impact on the pedestrians' urban environment, at the European, national, regional and local levels. Such policies range from urban and land use planning to detailed road and street design through transport and

traffic management, traffic safety, health promotion, reduction of CO₂ emissions or even regulatory policies on the prevention of terrorism and violence. Policies are rarely coordinated with regards to their impact on walking and on walking conditions although some of their components do interact. With such a complex decision-making system, analysing how current pedestrians' environments satisfy pedestrian quality needs requires a systems approach covering all relevant policy components.

Because of the number of stakeholders involved and the complexity of their relationships, there has been so far no system-based assessment of the quality of pedestrians' environments. However, analysing the current situation at the European, national or local level is needed to raise awareness of the need for progress in the public and in the relevant groups of policy-makers as well as to identify the priority problems to be treated. In order to facilitate the analysis, guidelines are proposed to check the level of satisfaction of pedestrian quality needs of policy-components and of the physical urban environment. Any of the stakeholders involved may take up the task and it is hoped that the methodological tools provided will encourage and help them. It is therefore suggested to develop a national observation system (NOS) of local practise on Pedestrian Quality Needs, to benchmark local authorities and promote effective strategies for improvements.

On the local level activities regarding walking and sojourning are focussed on concrete measures; policy statements and plans, organisational structure and means available, and the structural heritage regarding walking and sojourning, however, determine the quantity and quality of walking and sojourning. It is important that a local Urban Monitoring System (UMS) is established, to identify deficits in the local system for walking and sojourning and to make them visible.

The description of the policy elements to examine the current state of the pedestrians' environment underlines the complexity of the systems at the national and the local levels and the multiple nature of the analysis. None of the stakeholders who may be interested in performing the analysis can be expected to master the whole picture or even to want to consider all of it. In practice, they may choose to analyse only the elements which are more directly linked to the system they are responsible for or on which they are working. In order to get a complete state-of-the-art and to build NOSs or UMSs, the contribution of a number of different stakeholders will thus be required.

The analysis which has been suggested is neither an assessment nor an evaluation of the pedestrians' environment with regards to Pedestrian Quality Needs. To evaluate, one would have to use a priority ranking of needs, leading to a ranking of requirements and develop an indicator or indicators of achievement in terms of satisfaction of PQNs. To this purpose, further research is required.

The method of analysis as proposed here is nevertheless a useful tool to progress on issues of importance for walking: its application should pinpoint the areas or policy items where the situation is unsatisfactory or where too little is known of the items of concern for pedestrians. This will be where useful action can be taken.

Evaluation of performance and satisfaction The second part of the third policy development process frame concerns the evaluation of how *pedestrians* actually function, and how satisfied they are with what their environment offers. This section, Evaluation of the pedestrians' performance and satisfaction, by Rob Methorst, also suffers from limited information and data. By using multiple data sources and fine-tuned definitions, the real order of magnitude of performance indicators can be calculated. Thus basic real-numbers figures regarding handicaps, mobility, importance of sojourning, risks and pedestrian satisfaction are presented.

Methorst finds that performance of pedestrians with regard to their major objectives does not appear directly from available statistics. For a comprehensive and true picture of the pedestrians' functioning and satisfaction hidden issues must be uncovered. Available figures must be corrected for bias by complementary estimations. Reality must be evaluated from all relevant perspectives: functionality, perception, durability and future prospects and coherence and integration.

Pedestrians are an extremely heterogeneous group. The functioning of the system depends particularly on how well low competency persons can function. The order of magnitude of mobility restrictions can be estimated through much used indicators from the SF12 surveys and OECD indicators for Quality of Life studies. Additional indicators can be derived from travel surveys and health statistics on disorders. About 50% of the pedestrians have limited abilities and about 10% of the population has severe difficulties walking and sojourning in public space. Because of ageing of society these shares will increase substantially (in 2030 probably more than 12% of the EU population will have severe mobility handicaps) .

Mobility is defined by the freedom to choose to travel and sojourn in public space. The amount of distance that one can cover is less important than being able to make a trip. Pedestrian mobility differs from other modes by that it is part of almost all other trips. Multi-modal walking is (almost) as extensive as walking from door to door, but this is hidden in statistics. The hidden amount of walking can be estimated within reasonable margins.

Based on available statistics an image of major characteristics of walking can be formed. Action radius, age, urbanity and opportunities seem to be the most significant factors. The normal action radius of a pedestrian is ± 1 kilometre; an average (European) citizen walks 250 door-to-door trips per year and 1,800 times to and from other modes. In total pedestrians cover ± 300 kilometres and spend about 100 hours per person per year on walking.

Sojourning in public space is important because it is an indicator for quality of public space and it encourages all kinds of activities, which humans need for their well-being. There are many kinds of sojourning: professional activities, recreational activities, waiting, hanging out, but public space is also the home of the homeless and sometimes the scene of crime and violence. The concept of sojourning is rather unknown in the Anglo Saxon countries, but this article aims to help to change that. The average amount of time spent on sojourning is about 300 hours per person per year.

Safety and security concern the absence of risk, accidents and potentially harmful incidents. Safety includes security; security is seen as a condition, where one is protected against danger from the outside. As walking is the only mode open to all persons, safety and security must always be seen in the context of mobility and accessibility, particularly protecting the ones that do not have a choice but to walk.

The most used safety indicator is traffic accidents. As accidents that do not involve a moving vehicle, are excluded by definition, the data provide a severely biased image of pedestrian safety. Hospital data and medical assistance data show that single pedestrian accidents (falls), where no moving vehicle is involved, induce three to nine times as many casualties as pedestrian-vehicle crashes. Although the risk varies per country and type of accident, the total number of victims for Europe amounts to at least 1.6 million injured pedestrians per year in Europe (equals more than 3,000 casualties per million inhabitants).

As for fatalities, because of the overwhelming external force, pedestrian-vehicle crashes dominate the outcome. The total numbers of pedestrians killed vary from 9 fatalities per million inhabitants in the Netherlands to (more than) 46 in Poland. In the Netherlands the

number of vehicle related fatalities per million inhabitants is 6, whilst the number of fatalities from falls is 3.

Concerning severe injuries (casualties admitted to a hospital), for the moment, the only figures available come from the Netherlands. As traffic statistics indicate that the Netherlands is the safest country, the figures for other countries will probably be (much) higher. It is found that the total incidence of pedestrian injuries is 320 per million inhabitants (over 175,000 severely injured Europeans). Of this, 250 per million casualties result from falls (135,000 Europeans) and 75 per million from pedestrian-vehicle collisions (27,000 Europeans). The elderly run extreme risk.

For security the number of incidents is less normative than the fear and emotions it evokes. Compared to traffic accidents and falls, the actual risk on getting injured or killed in a criminal incident is substantially lower. Fear is a reality that needs to be taken into account, because it takes away people's freedom of mobility. Particularly during dusk and night time, especially females and the elderly fear to be involved in a harmful incident. Statistics show that the real number of criminal acts in public space is stable over the years.

Satisfaction is a state of mind related to the fulfilment of one's wishes, expectations, or needs, and it reflects the pleasure derived from this. There is little research carried out on pedestrian satisfaction. The sparse information about what *dissatisfies* people comes mainly from complaints that local authorities and NGO's received via hotlines, questionnaires or internet sites. It is striking that the aspects people communicate are mainly about operational nuisances and that hardly anyone mentions inadequate tactical or strategic level deficits, like network deficiencies, dysfunctional distribution of services etc.

With regard to walking and sojourning, demonstrable serious problems and deficits problems are partly or totally hidden from public, scientific and political attention. Major issues for policy making with regard to the pedestrian performance and satisfaction are:

- Large numbers of people have real trouble performing 'walking and sojourning' tasks. Because of ageing of the population the numbers will increase substantially.
- With regard to safety of pedestrians, particularly the prevention of falls is important; this is also an ageing related problem.
- There is too little awareness that without walking transportation is not possible.
- The vicious circle of no data – no awareness – no priority - no research – no data needs to be broken. The lack of data and information on walking and sojourning is imminent; Crucial concepts and statistical units need to be redefined and internationally applied.

Identification of compliance and satisfaction mechanisms Risser & Kaufmann's article deals with the Identification of compliance and satisfaction mechanisms regarding activities of stakeholders to support or improve conditions for walking and sojourning. They argue that, from a psychological point of view, compliance and satisfaction may be seen as belonging together in several ways. People do things only if they make sense to them. Common sense tells us that this refers to the advantages for themselves that are generated by doing certain wishes-for things, either in a material or in an idealistic sense. Rewards and sacrifices are dominant determinants for the outcome of decisions on services and measures for the support of walking and sojourning. The paper does not go into the evaluation of chains of events that lead to pedestrians' performance problems. This perspective needs to be dealt with later on.

Without appropriate communication, decisions are taken by decision makers that need co-operation by the public will not be accepted by relevant groups. What is provided, is subject to individual interpretation. Not only the physical provision of preconditions for walking and

sojourning are important, but at the same time how they are perceived. What is provided by public institutions ('by society') has to be sold in the sense of marketing. In this context it is important to be aware that there are differences between experts and users in the rating of the importance of indicators for measures to be taken. Risser argues that behaviour steering effects originate from five areas and that these areas are interrelated. The areas are the individual dispositions, infrastructure, mode, communication and societal issues.

With regard to satisfaction Risser and Kaufman conclude that research indicates that:

- products or services have to meet the addressed persons' (in market research called customers) expectations in order to provide satisfaction
- communication about any product or service can help to highlight relevant features of any service or product and has therefore the potential to enhance the addressed persons' satisfaction
- expectations, what is seen as a reward or as a punishment (sacrifice) in relation to these expectations, and the weight of both rewards and sacrifices when compared to each other's influence an addressed person's satisfaction

The consequences of the balance between rewarding and punishing elements derived from a certain type of mode use are different, depending on whether one has a choice or not. With regard to walking and sojourning, for persons who have a choice to walk or go by other modes or to sojourn either in public space or in shielded private spaces, they will avoid walking and sojourning in public space if they perceive rewards as being too small or the sacrifices as being too large. For captive pedestrians the same conditions mean that they will simply have to suffer the consequences. To this group of persons belong senior citizens (the older people get, the more they have to rely on walking), functionally impaired, poor persons (no car, no driving licence) and children and youngsters.

The use of offered facilities and services by pedestrians can be improved by information measures that improve satisfaction. De Lange and Joireman (2008) suggest that attention should be given to:

- the individual's needs and interests (are they met well when one walks?)
- equality issues (is equality provided when compared to other modes?)
- co-operation (is co-operation provided by the authorities, by the social environment, etc.?)
- competition (with whom does one have to compete when walking, how good are the chances to persist?)
- altruism (what is the paradox in altruism, meaning what advantages does it bring to oneself?)

At first sight it appears as that for decision makers there is no direct reward in supporting walking. However, good preconditions seem to be connected to good quality of life, which can be sold to voters and produce rewards. There are considerable risks to be dealt with: supporting walking have the potential to be experienced as disadvantage by car drivers. At the same time society as a whole does not protest if no radical improvements for walking are implemented. It looks as if to implement improvements for walkers depend on intrinsic motivation of politicians and decision makers 'to do the right thing'. Thereby they have the chance to act as avant-garde.

Identification of promising interventions At the end of their paper Risser and Kaufmann list types of measures that can be implemented to support walking and sojourning:

- Measures on the individual side
- Measures in connection with communication among road users
- Societal/structural measures
- Infrastructure measures
- Vehicle or mode related measures.

This list of different measures that can be taken in order to improve preconditions for walking and to bring them nearer to the pedestrian quality needs refers mainly to “official persons”, i.e. to those persons who have official responsibility for traffic and transport due to their function, or profession in society. They have duties, in this respect. For others, including researchers, it is a matter of interest whether they invest energy in order to make walking more visible or to enhance the development of better preconditions in connection with their work and/or their lifestyle. They have to be addressed by the „official persons“ in an appropriate way, through all these measures, and certainly a lot of other measures that have not been mentioned here.

Lucia Martincigh’s contribution focuses, from an architectural perspective, on the identification of promising interventions. She delivers a solid account of the process followed to determine promising measures with regard to public space and city infrastructure design, on the project level. She touches on other types of optional solutions too, without going into interventions on more general levels and larger scale (regional, national). Still, the experiences, principles and methods can be inspirational for those levels as well.

Martincigh’s essay outlines methods and tools useful to people with different professional expertise who, in their different roles and positions, in the public administration or as consultants, are involved in the improvement of the walking and sojourning conditions of pedestrians in the outdoor public urban spaces.

The determination of the actions to take can start only by the awareness of the presence of specific real problems and of their urgency to be solved. The first part of the essay deals then with possible methods to find out actual problems, of various order, and to prioritise them. It explains then how it is possible to devise solutions apt to face such problems, how the solutions can be evaluated for defining their consistency and appropriateness, and thence their success, both from the scientific and community viewpoint. Finally it describes briefly possible alternative solutions, organized in measures. They constitute different options among which to choose and concern various aspects of the analysed system: the pedestrians themselves, the social environment, the transportation system and the physical environment in which pedestrians travel and sojourn. The propositions are above all at tactical and operational level, but the application of some measures could, in time, influence some choice at a strategic level, for example the choice of transport mode, i.e. walking.

Assessment of potential pedestrian system output The last, fifth, frame of the policy development process deals with the decision of interventions and ultimately leads to the implementation of interventions. A crucial step in this frame is the assessment of the pedestrian system output. The major issue here is to find out what the external effects are of proposed interventions for the support of walking and sojourning. Thérèse Steenberghen wrote a contribution on this issue. Items to be assessed are the pedestrian system output regarding pedestrians needs, the survival, self-healing or correcting power in a wider context, the support offered by the pedestrian system intervention for ‘higher goals’ and lastly the degree to which the operators’ and decision maker goals are endorsed.

Assessment of the overall value of a pedestrian system raises a lot of difficult theoretical issues which are dealt with very differently in various disciplines. The proposed assessment of the pedestrian systems output is inspired by settings from multiple disciplines, thereby combining dimensions with the aim to allow for a more transparent discussion of trade-offs and synergies between impacts and objectives.

The understanding of how the pedestrian system works is inspired by system theory. The pedestrian system is viewed as a dynamic, open, complex and evolutionary system. For the assessment of the pedestrian systems output, a homeopathic approach is proposed; the value is addressed in terms of how well it reinforces the self-correcting, self-healing and survival mechanisms of the social, physical, economical and political environment.

When trying to implement these principles, ethical considerations related to the definition of 'correcting', 'healing' and 'survival' mechanisms cannot be ignored. These are not necessarily directly related to the final outcomes, but to the process through which these final outcomes are reached. To complicate things further, the overall outcomes have to be examined in their distributional effects. To tackle this dimension, a capability approach is tested out. Although there are not many applications at the macro policy level, the method is promising in the way it enables a structured discussion on benefits, distributional issues and ethics.

Identification of Gaps in Knowledge and Best Practice. With regard to Best Practises the main conclusion was that Best Practises should always be seen within their context; because of the complexity and the difficulty of finding good, general examples of good practise, it was decided not to include them in the Final Report.

In a comprehensive project such as PQN 358, it is almost impossible to summarise and describe all gaps in knowledge in the various parts of the project. Almost any topic covered, even those on which a considerable amount of knowledge exists, will have areas which are less well covered and on which additional knowledge would be helpful.

Hakkert attempts to highlight a number of issues which are felt to be critical for the provision of a high quality environment for pedestrians. The chapter touches upon issues related to the lack of appropriate planning models which take into account pedestrian movements, the allocation of space between pedestrians and motorized transport, missing information on infrastructure characteristics and their effects on pedestrian movements.

Related to safety there are major issues to be explored in connection with under-reporting of pedestrian accidents, pedestrian falls not being part of the general police reporting system, issues related to perceived safety.

Finally, tools that would assist politicians and decision-makers to find ways and budgets to improve the physical environment for pedestrians, including tools for economic analysis and tools for assessing joint benefits related to different fields of activity, including safety, health, the environment and quality of life.

8. INNOVATION OF PQN POLICY DEVELOPMENT

Introduction

The main objective of the COST 358 Pedestrians' Quality Needs project was to innovate policy development thinking and to show how policy development can be taken to a higher level. It was assumed that a systems approach, as introduced for other fields like road traffic safety, and health promotions, could also be developed for improving walking and sojourning conditions. Thus the project aimed to show the added value of a systems approach to improvements for walking and sojourning.

The problem is, however, that such an approach is not yet fully developed and implemented. Therefore, by definition, the added value cannot be shown. The PQN project offers a first sketch of such an approach. In the PQN Final Report part B Documentation – section 5 'Policy process', the state of affairs with regard to the documentation of the subsequent steps within a systems approach is pictured. In this paper an indicative SWOT analysis of the PQN systems approach is made. This analysis may be helpful for future projects.

SWOT analysis

Strengths

- A large interdisciplinary group of 70 dedicated researchers from 20 COST countries joined forces to exchange and acquire knowledge on the issue. This strength was amplified by concerted action with the OECD/International Transport Forum working group on Pedestrian Safety, Urban Space and Health (PUSH), WALK21 and the International Co-operation on Theories and Concepts in Traffic safety (ICTCT). Together this delivers credibility of the project's results.
- The PQN systems approach conceptual framework was developed, intensively discussed and generally applied throughout the PQN project. Strengths were identified. Weaknesses were mitigated and opportunities to apply and improve it were seized. The PQN framework also functioned as a point of departure for the OECD/ITF PUSH group.
- Whilst earlier approaches to the pedestrian issue relied heavily on specific policies like traffic safety, urban design, health promotion or school child protection, the PQN project started consequently from the pedestrian and his needs, abilities and from deficits in the system that made walking or sojourning difficult. The principle is that the system should adapt to serve mankind and not the other way around.
- The PQN conceptual framework helped to acquire better insight into the pedestrian system and widened the participant's perspective in several ways. During the project the original process design was improved on a number of points.
- To support internal and external communication a Glossary of applied concepts was compiled. Such a Glossary promotes uniform use of terms and helps to prevent misunderstandings.
- The PQN project combined and highlighted new⁷ insights. It appeared that the magnitude of some important issues differs substantially from what is known from common, traditional studies, the media and public emotions. Examples are: more pedestrians suffer severe injuries from falls than from collisions with cars while crossing the street;

⁷ Admittedly, these issues were not discovered by PQN research but by separate other experts.

walking to and from other modes takes about as much time in public space as walking from door to door; sojourning in public space is very important for city life.

- The PQN project made it clear that the pedestrian issue is much more complex than usually assumed and perceived. It also proved very difficult to substantiate the 'discoveries' because there is a real data availability and reliability problem.
- The PQN studies delivered basic data and estimations of the magnitude of the issue, which were not known before. The project underlines that knowledge is the key to improvement.
- The PQN system approach, much more than reactive approaches, offer prospect of effective, efficient and durable quality improvement for pedestrian.
- The PQN systems approach can easily be translated to other issues. The policy process design and methodological aspects do not uniquely apply for the pedestrian issue, but can be used in other processes as well.
- The PQN systems approach covers more options than traditional approaches and the subsequent intervention programs probably offer more value for money. It helps to prevent one-sided approaches. It helps identifying weak links. The Cascade principle acknowledges that in many cases problems can be best prevented by 'higher level' measures.
- The object is not only to improve conditions for pedestrians, but to support the improvement of the system as a whole, without negative effects for the wider system.

Weaknesses

- The PQN project leans on a relatively small forerunner group of experts contributions. The field is still new and lacks the seniority of other fields.
- The time span of the project was fixed to 4 years. Within that time frame it is not possible to completely cover such a complex issue (if ever). Some inconsistencies in definitions and conclusions, incomplete coverage of certain aspects of the issue remain.
- Ideally the PQN Working Group 4 Integration and Coherence, the working group that most intensively dealt with policy development, would have drawn from the results of the more technical Working Groups 1, 2 and 3. The latter Working Groups needed the full time frame to study their issues; Working Group 4 depended on intermediate results and their own expertise. The final integration has to be taken up at a later stage.
- Regarding policy program development it is more or less assumed that the necessary preconditions for this are met. In practise this is far from realistic. In the majority of cases knowledge about the pedestrian problems and their remedies is absent; the political will to invest in quality for pedestrians is just emerging; most often practitioners simply do not have the time or budgets for proper orientation on the state of affairs, improvement options. When there is money for implementation, there seldom is opportunity for evaluation of the measures etc.
- The PQN project did not come round to study implementation of measures. There is no insight in what is required for implementation, how the quality of implementation can be checked and balanced. This needs to be tackled in future projects.
- The PQN systems approach does not comply well with the dominant political feeling that the pedestrian issue is best dealt with by an integrated approach and by lifting along with other measures and policy programs. Although there are good arguments to keep some distance from this strategy, it does not make it easier to get things done.
- A political weakness is that the Design for All and PQN systems approach will benefit specific 'weak' groups, like children, the elderly and the handicapped mostly and not so much the 'common' and relatively powerful voters like young adults.
- A weakness regarding policy development and implementation is that political rewards are relatively small and mostly concern 'the feeling of doing the good thing'. Up till now enacting pedestrian policy programs did to yield rewards like additional voters budgets.

- In many municipalities a 'Bleeb system' is applied: whenever a citizen has a complaint, the municipality takes action to tackle the problem, and only that exact problem. The action does not affect policy in a wider context. The Bleeb System is applied because it is cheaper than methodical approach like the PQN systems approach.
- The PQN systems approach offers a long term perspective. On the short term it costs more than pathological or reactive policy strategies. Policy development takes up energy, time and money. The real profits come only in the last stage of the process; in the first stages there are only expenses. Real success will only come when there are proper investments made in knowledge acquisition/building, a good organisational structure and other preconditions provided.
- The PQN system approach suits national level policy making better than local level policy making. It means that one has to give in to larger schemes and higher order developments and determinants. On the local level approaches are preferably more focussed on doing, short term results and rewards, not so much on long term, structural results.
- Implementation of a systems approach presumes beforehand that the authority possesses a high level of knowledge and insight in the issue and what quality can an need to be improved. This is not self evident.

Opportunities

- Knowledge is the key to improvement. In the PQN project documentation ample indications can be found for the improvement of preconditions and target setting, analysis, effective measures and policy development.
- Individual measures are seen in a wider perspective and more easily connected to other policy aims.
- Negative side effects are spotted earlier, so that countermeasures can be taken..
- Measures will be (much) more effective and cost-efficient; costs and loss-of-face by failures will decline.
- It is clearer what measures have to be planned on the short and long run.
- It is clearer what the benefits of providing for walking and sojourning are. This can help improving the authorities' relations with its citizens, decrease in unexpected expenses on emergency measures, less complaints etc.
- Systems approach is relatively easily translatable into an interactive systematic, rational expert system on the computer, because of its stepwise process. This will make it easier to disseminate and be helpful as just-in-time-knowledge.
- Facilities for walking and sojourning are collective goods. Steg & Vlek (2009) state that meaning of value assigned to collective goods is far more remote, because these goods are shared, extend beyond one own backyard and often have a significance far exceeding an individual lifetime. Systems approach makes can help making citizens aware of this fact.
- There are many problems that can be solved by promoting and supporting walking and sojourning conditions. For example: currently many school children are driven to school, taking up escorting time, money and energy that can be better spent. By walking obesity and many serious disorders can be prevented; by taking care that the elderly can find their services in proximity, they can function independent until high age, without costs to society for transportation of goods and assistance.
- A systems approach delivers policy consistency. The better the system analysis, the better it yields. It can also deliver a guiding vision, that helps communicating and promoting change.
- The better you do stage 1 (vision) and stage 2 (analysis), the better the programs will be.
- Lifting policymaking and implementation above the ad-hoc and sectoral approaches.

- From the PQN Country Reports it is clear that some authorities still function at the Pathological policy maturity level, where in fact walking and sojourning facilities at the management level are not considered. The majority of governments function at the Reactive policy maturity level, where walking and sojourning is seen as 'important' and that measures will be considered whenever they receive serious complaints. A small minority will function on the Calculative policy maturity level, and have systems in place to manage all hazards: when the expected sacrifices for taking action do not exceed the expected short term benefits for the organisation as a whole. In all those cases the proposed the proposed systems approach will have added value.

Threats

- The approach calls for a lot of knowledge and insight and a rather mature organisation. In the current economic depression governmental organisations have to cut down costs and lay off staff. This is not a good climate for asking for money to attract or educate practitioners develop new policies.
- Demographic developments are virtually unstoppable. There might not time enough to invest in the development and implementation of structures to support the independent mobility of the elderly.
- Ageing of the population will probably lead to less tax income for governments.
- A population's growing car dependency gives rise to demand for additional transportation facilities, which goes at the expense of budgets available for walking.
- Urban sprawl thins the use of public space and pedestrian facilities in particular, making its use less visible and more difficult to maintain economically, because it will cost more per inhabitant, while the public space authorities' budgets will decrease.
- Because society is increasingly complex, many people find it difficult to keep up with the complexity of the governmental policies. They ask for simpler explanations; populist politicians offer these. A systems approach does not connect well to populist views. Its message is too complex to be taken up.

Conclusions

- The PQN systems approach is not so much an alternative approach, but an Ad-on or advancement of the more basic reactive and calculative approaches.
- Regarding the development of the PQN systems approach, we are not there yet. The PQN systems approach is a 'vision' and 'ideal' but not yet practise. Still a lot of work has to be done to solve practical policy development and implementation issues, to simplify the approach into a mature strategy and document its added value in comparison with current strategies. There still are many question marks. However, there seems to be quite a bit of drive for follow-up projects. The main issue will be how to proceed from knowledge to implementation?

9. PQN Detail reports

The PQN Final Report consists of 7 (sub) parts, which form in integral part of the PQN Final Report. All parts are posted on the CD-ROM that is included in this (paper) report. All parts are also downloadable from www.walkeurope.org and the WALK21 (www.walk21.com) and ICTCT (www.ictct.org) websites. The (sub) parts are:

- Part A Introduction and conceptual framework
- Part B.1. Documentation – Functional needs
- Part B.2. Documentation – Perceived needs
- Part B.3. Documentation – The future of walking
- Part B.4. Documentation – Measuring walking
- Part B.5. Documentation – Policy process
- Part C Executive summary

Apart from these final report parts the PQN project yielded some other useful source documents, such as the Country Reports that the delegates of participating countries compiled, a detailed COST Short Term Scientific Mission report on pedestrian conditions in the physical environment and a sources study to provide documentation for the substantiation of the PQN policy process. These are included in a separate folder on the CD-ROM.

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Appendix 1 Additional documentation from PQN.

Apart from the final report the PQN project yielded some useful source documents, such as the Country Reports that the delegates of participating countries compiled, a detailed COST Short Term Scientific Mission report on pedestrian conditions in the physical environment, a sources study to provide documentation for the substantiation of the PQN policy process and the results of a survey on data availability in European countries. These are included in a separate folder on the CD-ROM.

Country Reports

There are 18 Country Reports available, based on a basic questionnaire. Although the reports deal with the same items, the level of detail and perspectives taken differ from country to country. There are Country Reports available for 18 countries: Austria, Belgium, Czech Republic, Estonia, Finland, France, Greece, Germany, Israel, Italy, the Netherlands, Norway, Poland, Portugal, Serbia, Spain, Switzerland and the United Kingdom.

The questionnaire included the following main items:

1. Facts and figures
Which statistics are available, by what collection methods and definitions, for which years? What is the quality of the data?
2. (Recent) publications on pedestrian issues
What publications are there nationally regarding the general and specific research questions?
3. Current research projects
Which projects are currently carried out?
4. Policy statements
Current (published) policy statements regarding pedestrians and walking
5. Legal position of pedestrians
A short review of regulations regarding walking, the pedestrian and handicapped persons.
6. Best Practises
Which Best Practises examples do you know of in your country?
7. Innovations
What innovations can be spotted in your country?
8. General Atmosphere
The general atmosphere can be described using statement samples from the media and on the internet regarding:
 - The attitude towards pedestrians by other road users
 - Spotted behaviour of pedestrians and others towards pedestrians
 - Perception of the living environment and the quality of public space
 - Positions taken in discussions regarding walking and pedestrians
 Is there a Pedestrians Association or related NGO? What is its position?
 SWOT analysis of pedestrian situation in the country (Strengths, Weaknesses, Opportunities, Threats).

STSM Report Dell'Asin

In 2008 Giulia Dell'Asin carried out a so called Short Scientific Mission in Rotterdam at AVV Transport Research Centre and delivered a voluminous report based on the available

Country Reports, international databases and an internet search. The PQN national delegates were involved to validate the reported insights. Main items in the report are:

- 1 Country Comparison
- 2 20 Pedestrian-friendly cities in the PQN countries
- 3 Additional literature: “Pedestrian children”.

Sources study: Overview of insights in literature

For the support of the documentation and substantiation of the policy development steps, as identified in the PQN conceptual framework, the ITS-Radboud University carried out a sources study. The external research was made possible by additional funding by Rijkswaterstaat, the national road authority in the Netherlands. Evelien Sombekke and Herman Katteler performed the study.

Main items in the report are:

- 1 Identification of quality needs
- 2 Assessment of needs
- 3 Identification of requirements
- 4 Current level of service
- 5 Assessment of compliance and satisfaction
- 6 Identification of compliance and satisfaction mechanisms
- 7 Promising interventions
- 8 Assessment of potential pedestrian system output
- 9 References.

Survey – data availability in European countries

In the early stages of the PQN-project a survey was carried out with the objective to explore what type of data were available in each country and how they were collected. Participants were asked to provide information on all levels – national, regional, municipal and project-related – as far as this was possible. 10 countries took part in the survey and provided results: Belgium, Finland, France, Germany, Greece, Italy, Netherlands, Norway, Spain and Switzerland. The results are given as an overview in a separate file which acts as an annex to report B4 on Measuring Walking. The survey was coordinated by Daniel Sauter with the help of Melanie Kunz and the financial support by the Swiss Federal Roads Office and Swiss State Secretariat for Education and Research.

The main dimensions of data availability include:

- Transport behaviour (mobility statistics);
- Pedestrian volume (counts);
- Activity and time spent in public spaces (sojourn without mobility, stationary activity);
- Road danger (accidents, safety);
- Security: threats, attacks, harassments;
- Health: physical activities, competences (disabilities);
- Walking environment: quality accessibility, etc.;
- Ecological footprint;
- Perceptions, attitudes and images: ‘measuring the smiles’ and expectations of pedestrians;
- Investments, personnel, research: institutional aspects.

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Lucia Martincigh	B.1.15, B.3.12, B.5.11
Rob Methorst	A, B1.2, B.1.16, B.5.1, B.5.2, B.5.5, B.5.9, B.5.14, C
Hector Monterde i Bort	B1.1, B.1.2, B.1.9, B.1.16, B.5.7, C
Diego J. Moreno Ribas	B.1.8, B.5.7
Dominique von der Mühl	B.1.14
Iris Mühlenbruch	B.3.7
Nicole Muhlrاد	B.3.3, B.5.8
Hans Orru	B.3.8
Kati Orru	B.3.8
Panos Papaioannou	B.2.2
Eleonora Papadimitriou	B.1.6
Manuel João Ramos	B.3.5
Ralf Risser	B.1.7, B.2.1, B.5.4, B.5.10
Pavlina Rocakova.	B.2.4
Pilar Romay	B.1.4
Barbro Rönsch-Hasselhorn	B.3.7
Tiia Roivas	B.2.4
Fermina Sanchez	B.1.4
Daniel Sauter	B.3.1, B.3.2, B.3.15, B.4.1, B.4.2, C
Karel Schmeidler	B.3.11
Zuzanna Simonova	B.2.3
Rodolfo Soares	B.2.7
Thérèse Steenberghen	B.3.9, B.5.12
Rachel Thomas	B.4.4
Miles Tight	B.3.14, B.4.2, C
Rodney Tolley	B.3.6
Chiara Tonelli	B.1.15
Milena Vukmirović	B.1.11
Jim Walker	C
David M. Zaidel	B.4.5

