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Chapter 10

ASSESSING LIFE QUALITY IN TRANSPORT PLANNING AND URBAN DESIGN

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10.1 INTRODUCTION

Policies in the public space related to land use and traffic may significantly affect citizens' quality of life (QoL). Because policy measures are generally aimed to increase QoL, it is thus important to assess how QoL of affected citizens is influenced and to examine whether policy measures in the public space do (indeed) have positive effects on QoL. QoL assessments are important for effective and efficient planning; policy measures will be more acceptable, and thus feasible, if they do not significantly decrease individual QoL. Establishing satisfying communication between decision-makers and users is an important basis for achieving co-operation from different segments of the population, which is important if they are expected to change behaviour in some way to achieve sustainability. Instruments to assess QoL may be an important tool for organising community participation, which is considered to be very important:

Quality of life is not created by local professional staff acting as experts in implementation of a community's vision and action plans. Instead, community quality of life is decided each day through the individual actions of a community's residents. Therefore, these very residents are the only persons who can clearly articulate and implement the community ethos. It is the residents who must be empowered with the responsibility and luxury to frame the planning discussion.

(Grunkemeyer and Moss, 2004, p. 33)

This implies that QoL issues should be considered when working on integrated land use and transport planning.

All policy measures in the public space will, for logical reasons, involve at least five areas: (1) individual characteristics; (2) communication with other people or road users; (3) socialisation agents, culture, social establishment and media (summarised as social

aspects); (4) the infrastructure of the public space and (5) vehicle or mode characteristics. These areas interact, as reflected in the “diamond-shape” of Figure 10.1. This figure also underlines the necessity that several disciplines are involved in both planning and assessing effects of policy measures in the public space. The most relevant area of this diamond is related to infrastructure aspects, that is, most policy measures are infrastructure related. When hypothesising about how policy measures affect QoL aspects, we can start with the assumption that these changes will take place somewhere in the diamond below. Thus, aspects related to each of these themes should be taken into account when assessing the QoL of citizens.

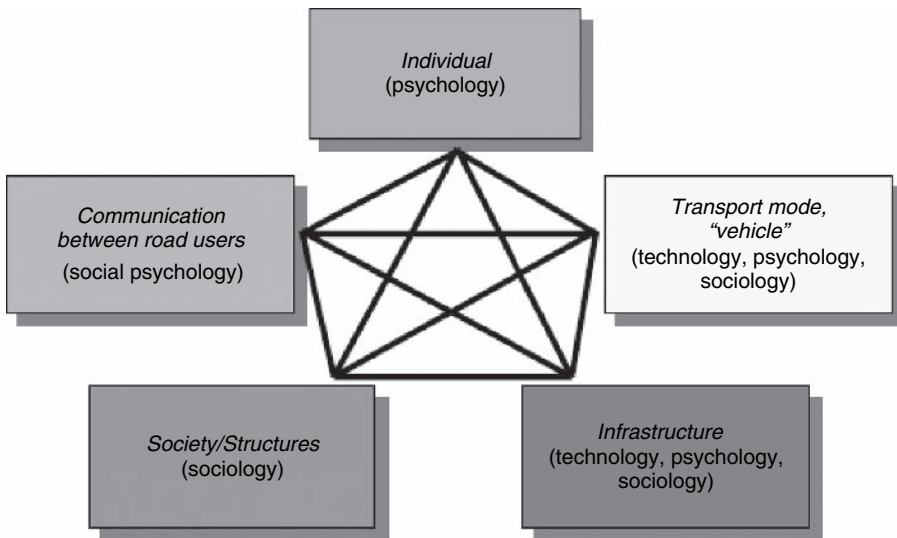


Figure 10.1: Traffic system – diamond (Risser, 2004)

QoL assessments do not routinely exist in the traffic and land use fields. Of course, some aspects that, according to literature, are related to QoL are taken care of – like accessibility, barrier-free environments, comfort, time-efficiency and many others. Other aspects related to QoL, such as independence, social relationships, personal values, environmental quality, are very rarely taken care of. As yet, no instruments are available to assess QoL issues comprehensively and systematically. The construct QoL is hardly ever applied as a holistic concept. Consequently, how QoL is affected by policies is hardly ever assessed appropriately. One may hope, though, that such assessments become more usual and are applied on a broad scale in the future. This is not easy to accomplish because of the lack of thorough knowledge about which QoL aspects should be considered when examining how policy measures affect QoL of citizens. Also, it is not known exactly which questions should be asked to assess the extent to which changes in the public space affect individual QoL.

One of the goals of the European Commission (EC) Key Action “Cities of Tomorrow and Cultural Heritage” is to improve QoL of cities in some respect. Whether QoL improves

or not has to be defined with the help of the involved segments of the population, given that QoL is a subjective issue by definition. Segmentation of the population is needed because various groups may have fundamentally different needs and interests. Policy measures may affect QoL of various groups differently, and conflicts of interest could result. Therefore, it should be examined how policy measures affect QoL of different user groups, for example, according to age, gender, mode choice or types of disabilities.

People who have the power to shape transport and mobility preconditions should know as much as possible about what different groups of citizens perceive as supporting their own QoL and/or how to inform people on (positive) effects of behavioural changes on their QoL. Experts in the area usually indicate that, “yes of course”, they do consider QoL aspects. But we could not find any documents, either in printed literature or via the Internet, in which this is done systematically, professionally and scientifically.

Accordingly, the ASI project – Assess Implementations in the frame of the Cities of Tomorrow – has aimed to find ways to define and assess QoL in relation to land use and transport planning. More specifically, the goal is to find out how issues of QoL are considered and taken care of in connection with implementation of the programme by the responsible groups and disciplines (e.g. politicians, planners, practitioners, researchers) and to develop a toolbox comprising instruments and guidelines to assess QoL effects of such policy measures. In this chapter, we discuss the main outcomes of the ASI project. The first part of the chapter discusses common practices on QoL definitions and assessments. In Section 10.2, we report results of a literature review on definitions of QoL and ways to assess QoL. In Section 10.3, we describe whether and how practitioners take into account QoL effects when designing and implementing transport and land use policies, by reviewing implementation of policies in cities that participated in the Cities of Tomorrow Programme. Also, requirements for instruments to assess QoL are discussed, as revealed from interviews and discussions with experts. The second part of the chapter focuses on the development and testing of instruments included in the toolbox to assess QoL in relation to land use and transport planning. In Section 10.4, we demonstrate the use of an instrument that enables decision-makers to assess effects of policy measures on QoL in general. Section 10.5 discusses instruments to assess effects of policies on urban QoL. Also, results of a pilot study are reported in which the instruments were tested. The practical value of the toolbox is described in Section 10.6.

10.2 QUALITY OF LIFE: A LITERATURE REVIEW

10.2.1 Defining Quality of Life

QoL is a concept which in recent years has generated a great deal of interest, but it is not only a notion of the twentieth century. Rather it dates back to philosophers like Aristotle (384–322 BC) who wrote about “the good life” and “living well” and how public policy can help to nurture it. Much later, in 1889, the term quality of life was used in a statement by Seth: “We must not regard the mere quantity, but also the quality of “life” which forms the moral end” (Smith, 2000).

QoL has been the focus of many studies but a consensus as to how it should be defined has not been reached (Ormel *et al.*, 1997; Lim *et al.*, 1999; Smith, 2000; Snoek, 2000). Many definitions of QoL refer to “well-being”, “satisfaction” and “happiness”. Well-being is either conceptualised as the objective living conditions of a person or the way a person perceives these conditions, that is, the subjective evaluation of living conditions (Nutbeam, 1998).

Despite the lack of consensus, it is possible to discern some form of agreement. For instance, most researchers would argue that QoL is a multidimensional construct (Cummins, 1999; Snoek, 2000; Hagerty *et al.*, 2001) and that it reflects how well individual needs and values are fulfilled in various fields of life (Diener, 1995; Steg and Gifford, 2005). Three dimensions of QoL have been proposed (Finlay, 1997; Snoek, 2000):

1. *Physical* – health status;
2. *Psychical* – self-mastery, self-efficacy, love, satisfaction, happiness, morale, self-esteem, perceived control over life, social comparisons, expectations of life, beliefs and aspirations;
3. *Social – Private*: social network, social support, level of income, education and job. *Public*: community, climate, social security, quality of housing, pollution, aesthetic surroundings, traffic, transport, incidence of crime, equality and equity.

The three dimensions interact with each other and if one domain changes then the others may follow. The social dimension is further divided into a public and private domain. Kent (1997, in Massam, 2002) described QoL and the public domain in terms of the “public good” which he defined in terms of minimum income, social security, health and education, equity and relationships with the community. In addition to this, others have added safety from crime, low environmental pollution and reasonable house prices (Roseland, 1997); culturally desirable working and living conditions, low level of traffic (Transportation Research Board, 2001); aesthetic surroundings (Dalkey, 1972 in Andrews and Withey, 1976; Transportation Research Board, 1998); greater influence and public participation (Frankenhaeuser, 1976).

Studies have found that communities who provide a high QoL have a competitive advantage when they try to attract both individuals and businesses (Winther, 1990; Transportation Research Board, 2001). However, evidence from many different studies show that the continuing urban growth and what that entails can destroy what we today value as contributing to our QoL. QoL is related to sustainable development (Burden, 2001; Steg and Gifford, 2005). Like QoL there is no definition of sustainable development that is universally accepted, but one proposed by the World Commission on Environment and Development (The Brundtland Commission) has been cited frequently: “meeting the needs of the present without compromising the ability of future generations to meet their own needs. . .” (OECD, 2001). Others have elaborated on the above, emphasising that sustainable development should ensure that environmental, social and economic issues are considered and sustained for an unforeseeable future (TDM, 2003).

The concept of QoL is highly relevant when considering sustainable development. It may be argued that QoL reflects the social dimension of sustainable development. This does not imply that QoL is affected by social conditions only. As described above, QoL may be affected by economic, social and environmental conditions. Since sustainability implies a balance between environmental, social and economic qualities, policies that seriously decrease individual's QoL can hardly be called sustainable (Steg and Gifford, 2005).

10.2.2 Assessing Quality of Life

How to measure QoL has been widely debated, and there is still a lack of standardised measures. Despite this, in the last 20 years, progress has been made and some form of agreement can be seen. Most researchers agree that measures of QoL should include subjective and objective indicators (Felce and Perry, 1995; Ormel *et al.*, 1997; Kim and Cho, 2003; Marans, 2003). Objective indicators represent observable life conditions, while subjective indicators represent the individual's appraisal of these conditions. QoL is usually assessed through the use of a set of indicators.

The set of indicators should be "limited" so they can be understandable and not overly detailed, lengthy, or complex. The indicators should be "comprehensive" so that a substantial proportion of the most salient or critical aspects of society are included.

(Andrews and Withey, 1976)

Transport and land use planning may affect individual QoL at different levels and in different domains. First, transport and land use planning may affect overall QoL, for example, when costs of car use would double, people may not be able to visit activities and locations that fulfil important needs such as social relations and leisure. In general, the intensity and way of travelling may have important consequences for QoL, since travelling enables one to fulfil various needs and goals, such as maintaining social relations, visiting leisure activities and attending classes. Thus, travel is an important element in the integration of society. Scholars from the University of Groningen developed an instrument to assess effects of environmental policies and/or conditions on QoL in general (see Steg and Gifford, 2005, for an overview). This instrument is based on research and theories on values and needs in relation to sustainable development and comprises 22 QoL indicators (Table 10.1). Effects of policy measures on QoL may be assessed by asking the public to what extent these policy measures would improve or deteriorate these 22 QoL aspects. The instrument proved to be successful in assessing QoL effects of environmental policies, among which are transport policies (see Steg and Gifford, 2005 for a review). This instrument may be included in our final toolbox to assess QoL effects of land use and transport planning. Therefore, we examined whether the instrument is useful to assess effects of transport policies on general QoL in different European Union (EU) countries (Section 10.4).

Second, transport and land use policies may affect QoL in specific domains, such as the quality of the urban environment. For example, the quality of the neighbourhood may decrease when new road infrastructure is built due to traffic noise, local air pollution or lack of safe crossings. Various studies revealed important indicators of urban QoL, such as (traffic) safety and security, (traffic) noise, availability of facilities, accessibility of various destinations and public transportation, lively neighbourhoods, number of people around,

Table 10.1: Description of 22 QoL indicators (Poortinga et al., 2004)

<i>Indicator</i>	<i>Description</i>
Comfort	Having a comfortable and easy daily life
Material beauty	Having nice possessions in and around the house
Status, recognition	Being appreciated and respected by others
Aesthetic beauty	Being able to enjoy the beauty of nature and culture
Security	Feeling attended to and cared for by others
Money, income	Having enough money to buy and to do the things that are necessary and pleasing
Partner and family	Having an intimate relation; having a stable family life and having good family relationships
Health	Being in good health; having access to adequate health care
Social justice	Having equal opportunities and having the same possibilities and rights as others; being treated in a righteous way
Leisure time	Having enough time after work and household work and being able to spend this time satisfactorily
Change, variation	Having a varied life; experiencing as many things as possible
Freedom	Freedom and control over the course of one's life, to be able to decide for yourself, what you do, when and how
Privacy	Having the opportunity to be yourself, to do your own things and to have a place for your own
Environmental quality	Having access to clean air, water and soil; having and maintaining a good environmental quality
Identity, self-respect	Having sufficient self-respect and being able to develop an own identity
Social relations	Having good relationships with friends, colleagues and neighbours Being able to maintain contacts and to make new ones
Spirituality, religion	Being able to live a life with the emphasis on spirituality and/or with your own religious persuasion
Education	Having the opportunity to get a good education and develop one's general knowledge
Safety	Being safe at home and in the streets; being able to avoid accidents and being protected against criminality
Nature, biodiversity	Being able to enjoy natural landscapes, parks and forests; assurance of the continued existence of plants and animals and maintaining biodiversity
Challenge, excitement	Having challenges and experiencing pleasant and exciting things
Work	Having or being able to find a job and being able to fulfil it as pleasantly as possible

orderliness, pollution, aesthetics, availability of green areas and illumination of public spaces (Van Poll, 1997; Bonaiuto *et al.*, 1999, 2003; Van Poll, 2003). Transport and land use planning may also affect QoL related to traffic and transport. For example, constructing a cycle lane improves cycling facilities, and thus the quality of the cycling experience.

Unfortunately, no comprehensive instruments are available to assess effects of land use and transport planning on urban quality and QoL related to traffic and transport.

Because we think such instruments are highly valuable for our toolbox, we developed and tested relevant instruments within the ASI project (Section 10.5).

QoL indicators may be assessed subjectively as well as objectively. When assessing how people feel about the community (subjective assessments), a survey is usually used. Survey studies may be aimed at assessing QoL in general, but also at assessing satisfaction with different QoL aspects. Typically, responses are given on a rating scale. The most common techniques use either a Likert-type scale (e.g. 1 = *very satisfied*, 2 = *satisfied*, 3 = *not satisfied*, 4 = *dissatisfied*, 5 = *very dissatisfied*) or a bipolar scale in which the score is located on a single dimension (e.g. *Delighted* – *Terrible*). Several indices measure both satisfaction with various aspects of QoL and how important these aspects are (Ferrans and Powers, 1985; Gill and Feinstein, 1994; Felce and Perry, 1995; Cummins, 1999; Poortinga *et al.*, 2001). The results from surveys can then be paired with objective data.

Leitmann (1999) argued that objective QoL indicators should have the following characteristics:

- *Measurable* – indicators should be quantifiable;
- *Based on existing data* – when possible, indicators should be derived from reliable existing information to speed up their use and minimise costs;
- *Affordable* – the financial cost and time required to assemble and analyse indicators should be prescribed by a predetermined budget;
- *Based on a time series* – the same indicator should be collected over a regular interval so that change can be evaluated;
- *Quickly observable* – indicators should change as conditions change so that they can accurately reflect reality;
- *Widely accepted* – indicators should be understood and accepted by their users;
- *Easy to understand* – indicators should be reported in a simple fashion so that a wide range of people can understand them; and
- *Balanced* – indicators should be politically neutral and allow for measurement of both positive and negative impacts.

Obviously, many of these characteristics are also important when considering subjective assessments of indicators. This list of requirements is quite idealistic. It may be hard to realise all requirements in practice. However, the list surely provides a standard to strive for.

10.3 PRACTICAL USE OF QoL ASSESSMENTS AND BARRIERS FOR IMPLEMENTATION

We aimed to compare and supplement results of the (theoretical) literature review with ideas and conditions set by practitioners. This should facilitate the development of instruments to assess QoL that are not only theoretically sound but also feasible in practice. We examined how QoL issues are currently taken into account in land use and transport planning. Further, we studied whether practitioners think it is important

to consider QoL issues and their wishes and demands regarding instruments to assess effects of policy measures on QoL. For this purpose, first, we conducted a qualitative interview study among practitioners and experts who are involved in various LUTR (Land Use and Transport Research) projects (Section 10.3.1). Second, an international workshop was organised, in which experts from various fields discussed the needs and conditions for QoL assessments (Section 10.3.2).

10.3.1 Interviews with Participants in LUTR Projects

In 2003, a qualitative interview study was conducted among experts participating in policy implementations connected to the LUTR programme. In total, 49 in-depth interviews were conducted. The interviews focused on ideas and definitions of QoL, relevant QoL indicators and the extent to which QoL-effects of policy measures are considered and assessed at different project stages.

Five LUTR sites were selected in different European regions, that is, in North (ARTISTS in Malmö, Eskilstuna, Tierp, Sweden), East (ECOCITY in Trnava, Slovakia), South (PROMPT in Modena, Italy), West (EDICT in Eindhoven, the Netherlands) and Central Europe (ECOCITY in Bad Ischl, Austria). Only sites belonging to a LUTR project or at least a project within the City – of Tomorrow Programme were selected because these projects generally deal with the QoL of different target groups. Further, all project focused on transport issues, either on a theoretical, planning or implementation level. The most important objective of all projects is to develop guidelines or strategies to reach more sustainable cities by decreasing car use or driving speed and promoting other forms of sustainable transportation (walking included) via structural changes in the physical environment. However, the strategies followed differ for the various projects and sites. Most projects were in the planning phase; the implementation had not been realised. The Dutch project, EDICT, was just discontinued when the interviews took place. Thus, our evaluation focused on the extent to which QoL issues are considered in the planning phase of projects.

At each site, in-depth interviews with about 10 experts who participated in the project development were conducted. As we aimed to get a broad overview of how QoL issues are being taken care of in LUTR projects, the selected group of experts was quite diverse, that is, they had different roles and tasks and occupied different functions within the policy-making, planning and implementation phases (i.e. city councillors, public administrators, policy advisors, traffic planners and scientists). We tried to interview experts with different disciplinary backgrounds. However, most experts appeared to have a technical professional background, such as engineering and architecture. Social and the economical trained scientists hardly participated in the five projects. The under-representation of economists and social scientists is remarkable because most projects dealt with QoL issues, which may be considered as the core business of economists and social scientists. As sustainable development implies balancing economic, environmental and social costs and benefits (Section 10.2.1), multidisciplinary teams including economic, environmental and social scientists are needed.

In each country, interview results were summarised and translated into English. Next, the full set of interviews was analysed. It appeared that QoL was defined quite differ-

ently by the interviewees. No clear definition of QoL emerged from the data. Also, a large variety of QoL indicators were mentioned. Overall, 108 different indicators were identified. Regardless of the fact that no clear definition of QoL and QoL indicators was identified, the majority of respondents indicated QoL is specified and/or operationalised in their project, and in some cases even “measured” (e.g. via interviews, focus group interviews, observations, questionnaire studies or dialogues). QoL indicators were defined at different levels and focused on different domains. In most cases, the QoL indicators were related to transport (e.g. accessibility, transport services). Also, general social and environmental indicators were defined, such as comfort and a pleasant environment. In many cases, respondents indicated QoL issues were considered only at the beginning of the project (before the implementation), while fewer respondents indicated QoL issues were considered during the whole project. One interesting finding is that answers of participants within a project did not correspond. Participants in the same project seem to disagree about the definition, operationalisation and measurement of QoL. This suggests that no clear procedures for assessing QoL effects of land use and transport plans are available.

10.3.2 Expert Workshop

In 2004, a 2-day expert workshop was organised titled “Transport, town planning and quality of life” in Brno, Czech Republic. Participants were ASI partners, invited experts from LUTR sites (Section 10.3.1) and experts on QoL. The main aim of the workshop was to discuss the definition and measurement of QoL and QoL indicators, as appeared from the literature review and interview study, as well as from input from the workshop participants. Further, requirements for the practical use of QoL instruments to be included in the toolbox were discussed. Because some of the invited experts presented a paper on their own work as well, we had another opportunity to examine whether and how QoL is being taken care of in different land use and transport planning projects.

In the workshop, some important issues were raised that are important for developing instruments to measure QoL in the urban context. It appeared that in many projects, QoL issues are being considered implicitly. The importance of considering QoL issues in transport and land use planning is widely acknowledged. Also, experts generally stressed that objective as well as subjective indicators of QoL should be considered, especially because quality is a subjective issue by definition. In accordance with the interview study, it appeared that people involved in land use and transport planning projects do not have much information about how to define and measure QoL. A toolbox comprising instruments for measuring QoL would be highly valued, because it could provide those involved in land use and transport planning with more precise information resulting in a more efficient and effective decision-making process. It was stressed that the toolbox should be highly practical, usable and very easy to understand and use for politicians and decision-makers. The toolbox should be easy to administer by relevant experts, such as town counsellors; for example, it should comprise a limited set of key indicators that could be measured relatively easily within a short time frame. More detailed instruments may be developed for expert use only, comprising a more elaborated set of key indicators. Relevant key indicators should be clearly defined because some indicators may have different meanings in different disciplines, and thus be a source of misunderstanding.

A toolbox should permit multiple uses, that is, the toolbox may be helpful in defining problems, in evaluating possible solutions for problems before actual policy measures are implemented and in evaluating the effects of such policies.

10.4 ASSESSING EFFECTS OF LAND USE AND TRANSPORT PLANNING ON QoL IN GENERAL

As described in Section 10.2.2, an instrument was available to examine to what extent land use and transport planning would affect individual QoL in general (Poortinga *et al.*, 2004, see Steg and Gifford, 2005). We further tested the practical value of this instrument in different cultures and contexts by conducting an Internet survey among 490 respondents in five different countries in the North, East, South, West and Centre of Europe, respectively (i.e. Sweden, Czech Republic, Italy, the Netherlands and Austria). A detailed description of the study design and results is given in De Groot and Steg (2006a,b). Here, we focus on the main results.

First, we examined how a transport policy aimed to reduce car use, that is, doubling costs of car use, may affect individual’s QoL. Second, we studied to what extent respondents from the five EU countries would differ in their evaluation of expected changes in QoL changes when the policy would be implemented. Respondents indicated that this rather stringent measure would hardly affect their overall QoL. The expected changes in the 22 QoL indicators confirm this result: People expect that most QoL indicators would not change much when this policy is introduced. Figure 10.2 shows the expected consequences for QoL aspects that change most when costs of car use are doubled. Some relatively large negative changes are expected for the aspects comfort, money/income, freedom, change/variation, leisure time and work. There are only three QoL aspects

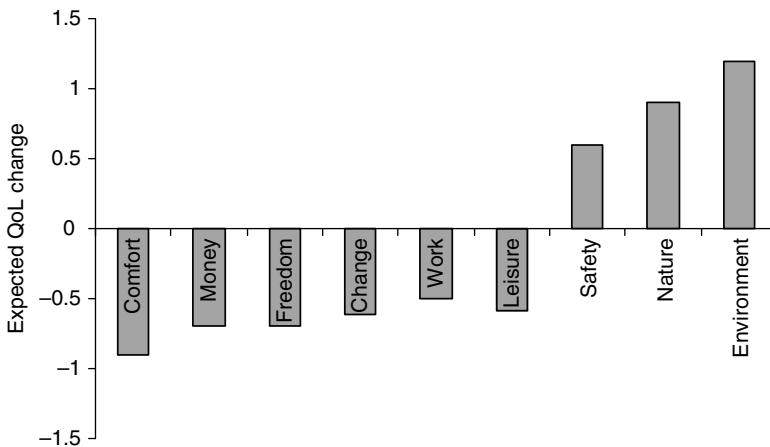


Figure 10.2: Expected changes in QoL aspects that change most strongly when prices of car use double

that are expected to improve: environmental quality, nature and biodiversity and safety. Because respondents indicated that their overall QoL would hardly be affected by this policy, these results suggest that negative changes in QoL may be compensated by aspects that are expected to improve.

Results of this study further showed differences between the five countries in expectations on changes in QoL when prices of car use would double. In general, respondents from the Netherlands and Sweden are more pessimistic about possible effects on their QoL than are respondents from the Czech Republic, Italy and, to a lesser degree, Austria. More specifically, they expect the policy to have less positive effects and more negative effects. It is important to understand why people in different countries expect different QoL effects from this policy because this may reveal how possible negative QoL effects may be prevented and/or compensated. The differences in expected QoL effects may be due to differences between the countries in, for example, spatial structure, or the availability and quality of various travel modes, which may affect car dependency in those countries.

Because transport policies will be less acceptable, less feasible and less effective if they have significant negative impacts on QoL (Steg and Gifford, 2005), studies like this could provide recommendations on how to adjust or supplement policies that guarantee effective and efficient decision-making.

10.5 ASSESSING EFFECTS OF POLICY MEASURES ON URBAN QoL

10.5.1 Instruments to Assess Effects of Policy Measures on Urban QoL

10.5.1.1 Defining Urban QoL

Based on the outcomes of the previous phases of ASI (i.e. literature reviews, extensive interviews and discussions with experts), instruments were developed to assess effects of policy measures on urban QoL. It was decided that the instruments should meet the following general requirements:

- they should explicate the object of evaluation (what to measure);
- they should explicate the methodology to be used (how to measure and assess);
- they should include objective as well as subjective indicators;
- they should be as simple as possible, easy to administer, yet still be profound and comprehensive to assess the influence of land use and transport policies, strategies, plans and designs on the quality of the living environment of users involved.

The main assumption behind our approach is that QoL should be evaluated first of all by examining user perceptions, that is, what users see and care for, because this is what eventually has to be improved. Planners and technicians though can act only on objective situations. These can be regarded as the handle to be used for influencing user perceptions and satisfaction. Therefore, a key set of indicators was defined for which

objective data as well as subjective evaluations may be collected. Subjective aspects are related to people's values and perception of the environment and can be investigated only via interviewing people (e.g. via questionnaires or personal interviews). Objective aspects are related to the environment in which people move, to its performances and to the way in which it is used by users. These objective aspects can be directly or indirectly assessed without any critical participation of users. To get a broader view, perceptions of experts involved in the project may also be assessed by using the instruments developed to assess user perceptions. This enables one to compare expert views with user perceptions.

Based on the literature review, expert interviews and workshop, a list of "high level" enquiry fields was developed, reflecting main categories of urban QoL indicators. For each category, specific indicators were defined (Table 10.2). Measuring methods and guidelines were outlined for both subjective and objective assessments. A questionnaire was developed for subjective evaluations to administer to users and experts, before and after the implementation. Furthermore, a list of (objective) parameters to be assessed by skilled technicians including user guidelines was compiled. Each of these will be explained below.

Table 10.2: Overview of key set of QoL indicators and way to assess these indicators objectively

Mobility for all (availability and accessibility)

- Percentage of residents with an access to the public transport network nearer than 500 m
- Percentage of access points to public transport with total accessibility
- Percentage of public transport means with total accessibility
- Percentage of sidewalks with total accessibility
- Percentage of pedestrian crossings with total accessibility
- Travel time/distance ratio

A safe environment (safety)

- Number of accidents (considering all the possible combinations cars/motorbikes/bicycles/pedestrians)
- Percentage of users which witnessed, directly or indirectly, a traffic accident in the area during the last 5 years
- Percentage of street-km in the network with 30 km/h (or lower) speed limit
- Percentage of street-km in the network with 30 km/h (or lower)
- Actual speed measured

A comfortable environment (comfort)

- Percentage of pedestrians using legal crossings (in comparison with the total crossing flow)
- Percentage of pedestrians using sidewalks (in comparison with total longitudinal flow)
- Percentage of traffic light with pedestrians' red phase longer than x seconds
- Yellow traffic-light phase
- Percentage of streets with sidewalks wider than 3 m
- Percentage of streets with open-air noise > 55 dBA
- Percentage of streets with in-house noise > 45 dBA
- Traffic flow volume and composition

A secure environment (security)

- Percentage of users who witnessed, directly or indirectly, a petty crime episode in the area during the last 5 years
 - Number of lights/m²
 - Amount of light lumen/m²
 - Number of open activities/m along the street (day/night)
 - Number of "eyes and ears" along the street (day/night)
-

Table 10.2: (Continued)

<i>A clean environment (cleanliness, no pollution)</i>
Percentage of overfilled garbage bins (just before the garbage collection)
Number of wastes left on the ground/m
<i>An appealing environment (aesthetics)</i>
Number of interesting views present on the path
Number of green elements/m or percentage of green area/m
Number of landmarks and/or point of reference/m
Percentage of the rectilinear length of the path
<i>A busy environment (availability facilities)</i>
Number of services per metre of path (opening times: day/night)
Number of shops per type: daily, weekly, per metre and opening times (day/night)
Number of facilities (bar, coffee shop, restaurants, kiosks, etc.) per metre of path (opening times: day/night)
<i>A lively environment (social aspects)</i>
Number of formal and informal seats (benches, stools, sitting walls, balustrades, rails, columns)
Number of squares, widening
Number of elements of urban furniture/m

The overall evaluation of policies will be based on analysing the subjective data (from users and experts) as well as the objective data. Comparisons may be made between objective indicators and subjective judgements, between user and expert perceptions, and before and after the implementation.

10.5.1.2 Subjective Evaluation of Urban QoL Indicators

The questionnaire is composed of two parts. The first part focuses on general information about the interviewees (gender, age, mobility habits, etc.) as well as on information regarding the context in which the interview takes place (e.g. season, hour, location). The second part, which represents the core of the questionnaire, comprises questions strictly related to relevant indicators to be investigated. For each indicator listed in Table 10.2, interviewees are asked about their satisfaction with the particular indicator and the importance they assign to the indicator. In the pilot study (Section 10.5.2), satisfaction was expressed on a yes/no basis,¹ while importance was rated at a Likert-type scale ranging from 1 “not important at all” to 5 “very important”.

The judgements on importance (important vs. not important) and satisfaction (yes vs. no) may be combined and plotted in a two-dimensional Cartesian Plane (Figure 10.3). The positioning of each indicator in the four quadrants helps to focus possible interventions so as to address the most urgent and relevant issues.

10.5.1.3 Objective Evaluation of Urban QoL Indicators

Table 10.2 gives an overview of how to assess the indicators objectively. Objective measurements are to be made with different methods, for example, direct observations, measurements, brief interviews, surveys, map analysis or archive data collection. The

¹ In the final instrument, satisfaction will be measured using Likert-type scales as well, see Section 10.5.3.

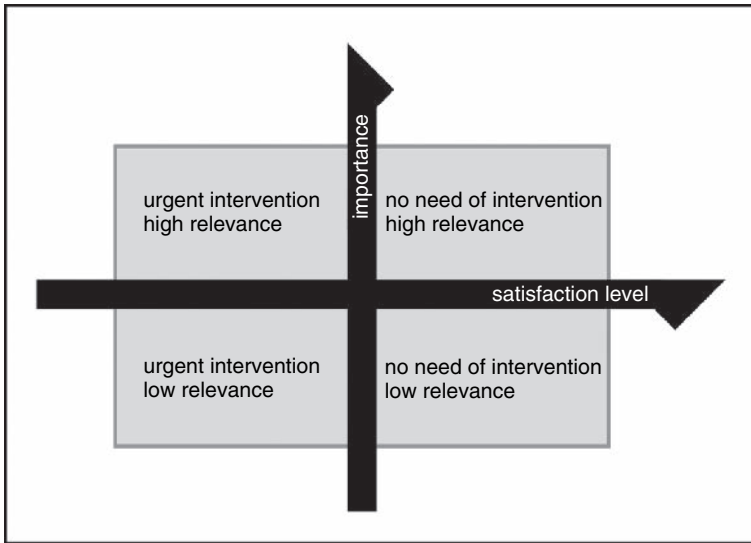


Figure 10.3: Cartesian plane

method to be used depends on the aspect to be assessed. Data may be reported with general and thematic symbolic mapping. All data may be printed in a multidimensional picture of the local situation, focusing on aspects that influence urban QoL with regard to mobility. Data should be collected by skilled technicians following the guidelines provided (Figure 10.4) to ensure reliable and valid results that are replicable. For each indicator, reference values were deducted from previous research works (mainly studies

A sidewalk is accessible if:

- it has a minimum width of 1.50 m along 60% of its length
- it does not have any passage narrower than 0.90 m
- it has an access point (i.e. ramp) at the two ends and at least every 100 m
- it has an even surface

The diagrams illustrate the guidelines for measuring indicators objectively. The first diagram shows a cross-section of a sidewalk with a minimum width of 1.50 m and a ramp. The second diagram shows a top-down view of a sidewalk with a ramp and a passage width of 0.90 m. The third diagram shows a side view of a sidewalk with a ramp and a passage width of 0.90 m.

Figure 10.4: Guidelines for measuring indicators objectively: how to recognize an accessible sidewalk

conducted in the LUTR cluster, such as PROMPT and ARTISTS) or from national and international standards, such as World Health Organization (WHO) indications, European norms, Italian laws and Italian National Research Council (CNR) norms.

Data can be collected by using simple tools such as tape measures to determine the width of sidewalks or simply counting of traffic flows. In other cases, special equipment is needed, for example, for assessing noise or car speed. In many cases, data can be collected through direct observations of user's behaviour. For instance, assessing the share of pedestrians "legally" crossing at signed point of total crossing pedestrians provides clear information about the efficiency of street design, in particular of the crossing points' displacements and effectiveness.

Some objective data have to be collected via brief interviews with users. Information about modal split and transportation systems' efficiency may be assessed through interviews with arriving people, by asking them about their point of departure, travel time and transport mode used. Interviews may also be used when statistical data is not reliable because of small sample sizes or difficulties in achieving data. For example, traffic safety can be evaluated indirectly by computing the share of users who witnessed, directly or indirectly, at least one traffic accident in the area during the last 5 years. Finally, information can be achieved directly from maps and archives. These can be used, for instance, to compute the number of dwellers who have access to public transport within 500 m from their homes or to simply retrieve accident data.

10.5.2 Pilot Study

The instruments to assess urban QoL were first tested in a pilot study conducted in the town of Umbertide, in the province of Perugia, Central Italy, where the town municipality planned the implementation of a new cycle path. They aimed to construct a cycle ring running around the main residential area of Umbertide (Figure 10.5). The object of the ASI pilot study was a stretch of about 1.2 km that links two parks, two supermarkets

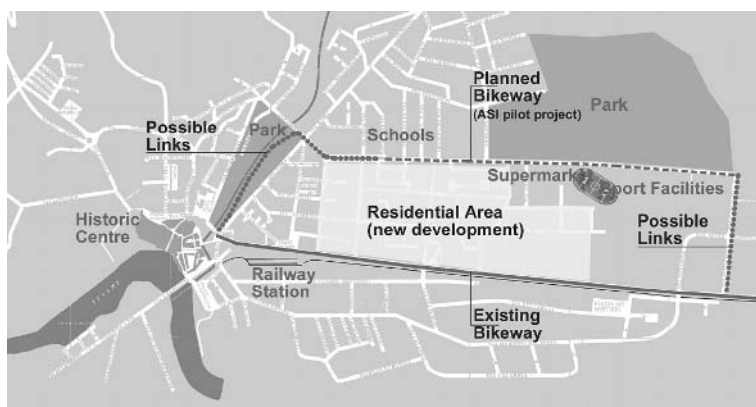


Figure 10.5: Construction of a new cycle path in Umbertide, Italy

and a school. The main part of the planned stretch runs along a wide and straight road with rather fast driving cars (i.e. Via Morandi). The cycle path was planned and realised mainly on the sidewalks with the idea of avoiding interferences between cars and bicycles. The intervention was in most cases simply constituted by painting part of the sidewalks red and by adding proper traffic signs to indicate where the space has to be shared by pedestrians and cyclists. Some work has been done to guarantee the continuity of the path and to organise junctions (Figures 10.6 and 10.7).

The aim of the pilot study was twofold. First, we aimed to test the instruments to assess effects of policies on urban quality that were developed within the ASI project. Second, we aimed to examine effects of the cycle ring construction on urban quality (which was especially relevant to the local government of Umbertide). Interviews, surveys,



Figure 10.6: Via Morandi, before and after the construction of the cycle path



Figure 10.7: Shared space signs and continuing cycle path after a junction

measurements and observations were conducted to test the value and feasibility of the instruments and to examine whether the first draft of the instruments could be further improved. Data were collected before (November 2004) and after (May 2005) the cycle path construction by the ASI research group in Rome with the support of Town Municipality technicians.

10.5.2.1 Analysis of Situation Before the Construction of the Cycle Path

In total, 60 persons moving around in the area where the cycle path was planned were interviewed during two days (13–14 November 2004). The standardised questionnaire was used, complemented with a single question regarding the cycle path (i.e. a situation-specific indicator that was of specific importance to the local government of Umbertide). Figure 10.8 shows the mean importance and satisfaction ratings of users of the relevant indicators of urban QoL. It appeared that users were quite satisfied with the situation in the pilot study area. In general, users were less satisfied with aspects related to safety and security, traffic conditions (car speed, traffic flow, etc.) and with the lack of people and lively spots, especially at night-time. These indicators are up to improvement, especially because they are considered to be important by users. The large majority of the indicators were judged as important, indicating a proper selection of indicators of urban QoL.

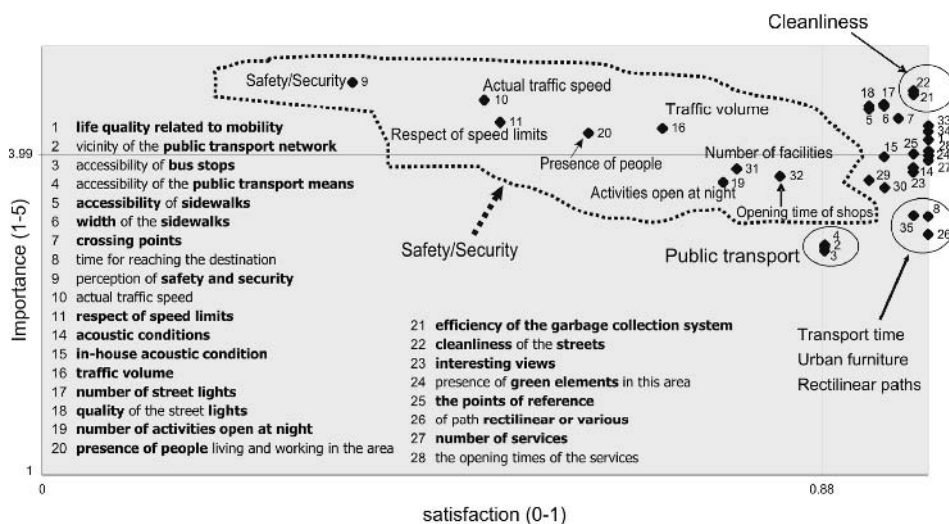


Figure 10.8: Subjective evaluation of users before the construction of the cycle path: importance and satisfaction

Next, in total, 11 experts have been interviewed on 30 December 2004: two employees of the Technical Office of the Town Municipality, two councillors of the Town Municipality, one member of the Town Council, two policemen from Provincial and Town Municipality stations, three representatives of User Associations (Disabled People

Relatives Association, Elderly People Association, Caritas) and one practitioner. Each interview lasted about 40 min.

Overall, the experts expected an improvement of urban QoL and social relations after the cycle path had been constructed. Figure 10.9 shows some significant differences in importance rating of indicators between users and experts. Overall, users tend to evaluate a smaller set of indicators as very important as compared to experts. In general, experts rated the availability of public transport as more important than did users.

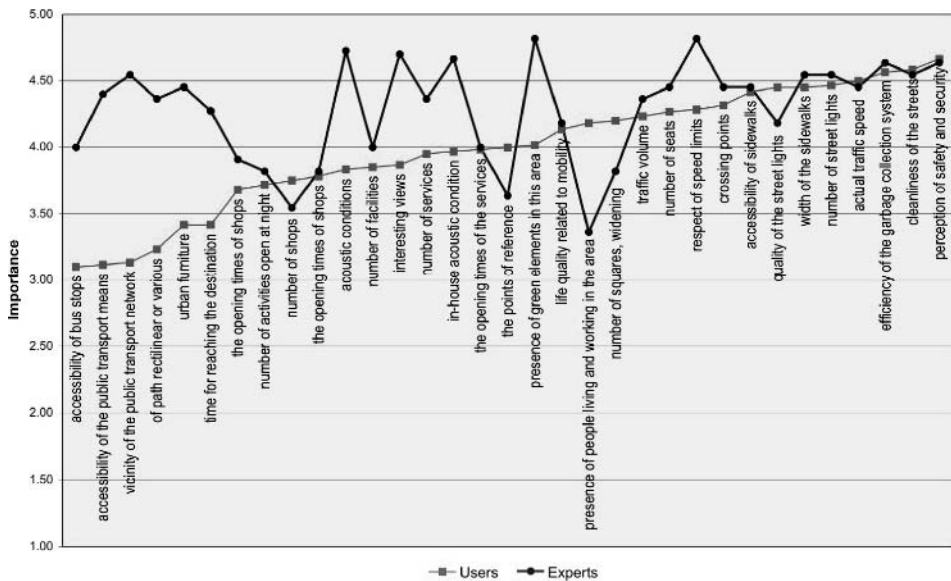


Figure 10.9: Subjective evaluation before construction of the cycle path: differences between experts and users in importance ratings of indicators

Apparently, experts perceive public transport as a good solution to many problems, while users generally prefer private transport. Furthermore, experts differ from the public with regard to the importance of green areas, acoustic conditions and indicators related to the appeal and liveliness of the environment (urban furniture, interesting views, etc.). This may mean that users are more pragmatic and want to solve one problem at a time. Moreover, the public’s point of view seems to be more related to local conditions and personal experience, while experts are possibly more influenced by collective interests. The results presented in Figure 10.9 underline the importance of collecting user’s judgements on the importance of indicators of urban QoL, since experts may not assess users’ perceptions accurately.

With regard to the objective evaluation, the majority of on-site survey data was first reported graphically and plotted on a map that constituted a basis for the subsequent

analysis (Figure 10.10). Next, different thematic maps were made, which provide more detailed information on a specific topic. Analysis of the different thematic maps facilitates the understanding of the local situation. The objective data confirmed some of the concerns expressed by users. For example, users reported concern with high traffic speeds, which may be connected with concerns about traffic safety and lack of lively spots, especially at night. Indeed, the objective data revealed that traffic speed is quite high at some locations in Umbertide (Figure 10.11).

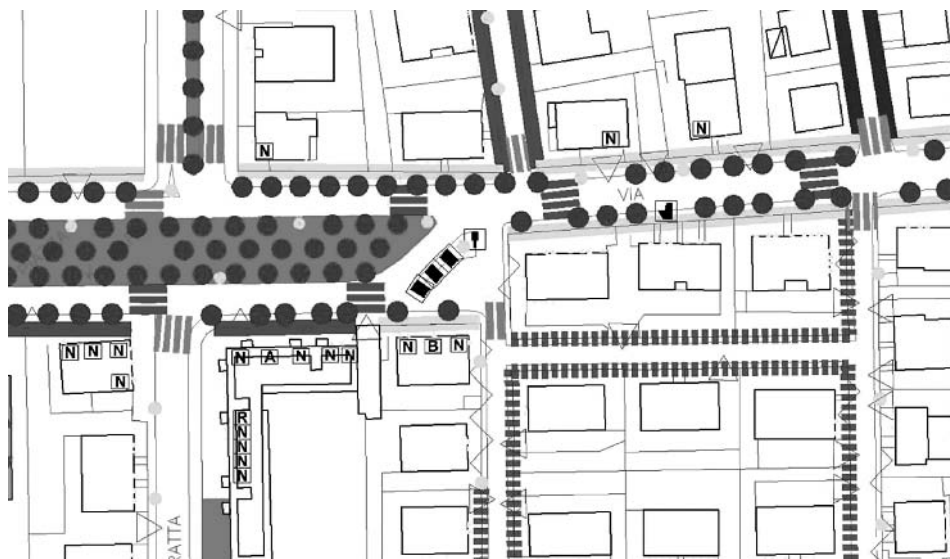


Figure 10.10: Sample illustration of the symbolic mapping of objective indicators

10.5.2.2 Analysis of Situation After the Construction of the Cycle Path

Objective and subjective measurements have been repeated after the realisation of the cycle path. Again, 60 users moving around in the pilot study area have been interviewed. This time, objective measures were made only for indicators that were expected to change due to the construction of the cycle path. Only few changes in objective conditions were registered:

- pedestrian exclusive space decreased as sidewalks had to be shared by pedestrians and cyclists (i.e. the cycle path was realised on stretched that used to be sidewalks);
- the share of pedestrians crossing streets at signed points increased, probably because of the repainting and partial reorganisation of some junctions.

Although a reduction of car speed was expected because of the narrowing of the carriageway in some points, no changes in car speed were observed.

Despite of these results, the interviews with users revealed some notable change in users' perception, as can be seen in Figure 10.12. In general, users are more satisfied with all

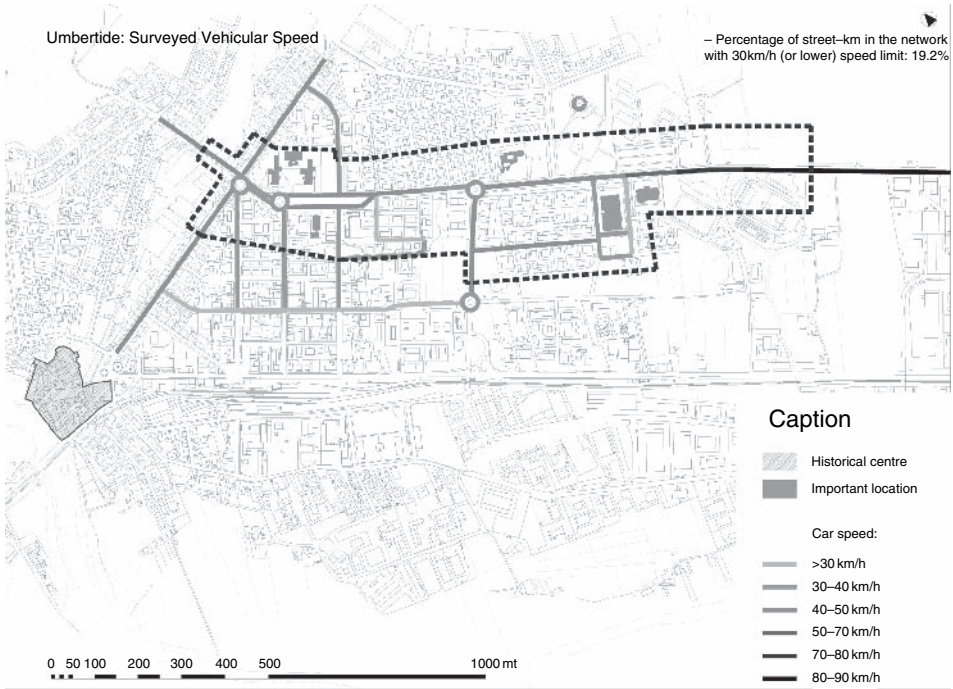


Figure 10.11: Thematic map: traffic speed in Umbertide

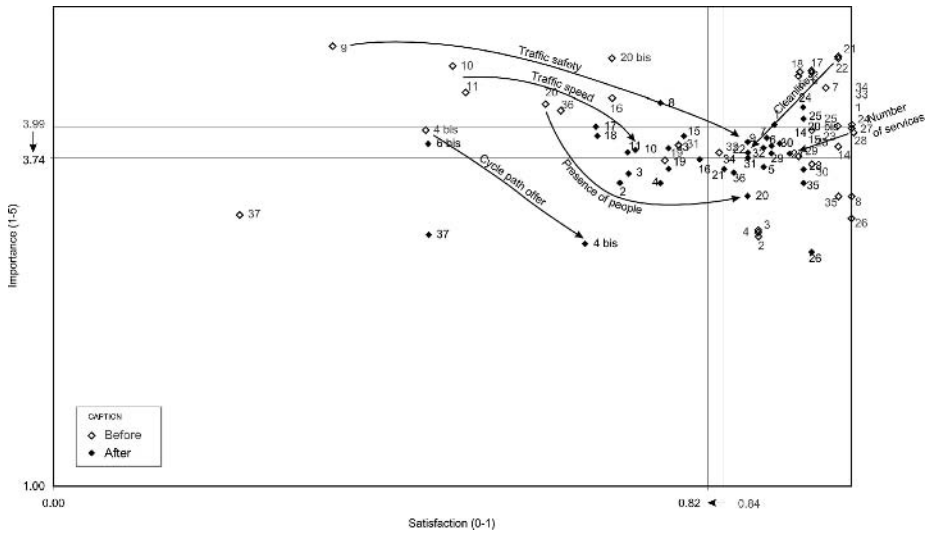


Figure 10.12: Satisfaction ratings before and after the construction of the cycle path

safety and security indicators. On the one hand, this makes sense, since the construction of the cycle path was aimed at increasing traffic safety. On the other hand, the results are surprising since no improvements in objective indicators were demonstrated (e.g. no differences in actual car speed were observed). A possible explanation could be that the initiative taken by the Town Municipality to improve the traffic system and increase traffic safety gave the impression in people's mind that things were improving. These results once more underline the importance of considering user perceptions because some aspects may not be captured by collecting objective data only. In current practice, subjective evaluations are hardly being considered. The instruments developed in this project may be very important to study effects of policies, by examining which objective changes take place, how these changes are perceived by the public and relationships between objective and subjective evaluations.

The most significant practical results of the pilot study are reported in Box 10.1. In sum, the pilot study yielded some interesting results and revealed the potential value of QoL assessments. The instruments proved to be quite feasible and easy to administer. However, the questionnaire was probably a bit too long. Ways to reduce the number of questions without losing important information would be advisable. Therefore, we conducted another study to fine-tune and cut down the instrument.

Box 10.1: Practical Results of the Pilot Study: Effects of Cycle Lane Construction for Urban Quality

Aim

Examine effects of cycle lane construction on urban quality

1. Identify user needs before construction of the cycle path (identify problems)
 - Users are concerned about aspects related to safety and security, traffic conditions (speed, traffic flows, etc.) and lack of lively spots at night-time. Objective data partly confirm these concerns.
 - Experts evaluate quality of transport-related aspects (e.g. accessibility of public transport) as more important than users do.
2. Evaluate effects of cycle lane construction on urban quality
 - The objective situation hardly changed, but users were more satisfied with issues related to safety and security after the construction of the cycle lane.

Conclusion

- Problem definition: Objective data confirmed concerns expressed by users. Experts may not have accurate views of user needs and perceptions.
- Evaluation: QoL may improve even when little objective changes take place.
- Instruments proved to be easy to administer.

10.5.3 Further Developing Instruments to Assess Urban QoL

The results from the pilot study were analysed with the purpose to refine the instrument used to collect user perceptions. For instance, items which correlated with each other (i.e. a correlation coefficient exceeding 0.8) were excluded to ensure that each construct was discrete from each other. This refined instrument was then tested in three different countries (Austria, The Netherlands and Sweden) to examine which clusters of QoL indicators (i.e. domains of urban QoL) could be distinguished and to examine to what extent the indicators are related to overall judgements on urban QoL. To better reflect the procedure of other studies, only ordinal scales were used. Thus, satisfaction was expressed on a seven-point scale (ranging from *very dissatisfied* to *very satisfied*), while importance was rated on a seven-point scale ranging from *very important* to *not important at all*.

In total, 134 questionnaires were collected. Further statistical analysis was carried out including correlation coefficient analyses, multiple regression analyses and factor analyses. The results showed that a general question about life quality in the community significantly correlated with most of the indicators in the questionnaire. The results also indicated that all indicators were important, although some more than others. For instance, security was seen as very important by 57% of the participants, whereas only 11% would argue that resting places were very important. A multiple regression analysis was carried out using general evaluation of QoL in the neighbourhood as the dependent variables and the 24 indicators as the independent variables. The results showed that six of the indicators explained 48% of the variance, which is more than satisfying. Indicators which contributed to people's satisfaction with their community included street lights, green elements (i.e. trees and flowers), a good social life, safety and ability to cross the street in a convenient way.

A factor analysis of the 24 indicators was carried out to determine if the toolbox included more than one domain. The result from this exercise presented seven different factors (Table 10.3).

The results presented seven different factors and the combination of items appeared to reflect some distinct areas. The first one deals with activities for offer and is therefore labelled "opportunities". The second one is related to barriers and how easy or hard it

Table 10.3: Results of factor analysis on indicators of urban quality of life

Factor	Label	Variance (%)	Indicators
1	Opportunities	11.8	Activities, different facilities
2	Accessibility	10.2	Barriers, crossing points, separation of pedestrians and cyclists
3	Liveability	10.1	People living and working in the area, cleanliness, aesthetics, green areas
4	Calmness	9.2	Speed, noise, volume of traffic
5	Recreation	8.5	Resting places, public places, cycle paths
6	Protection	8.0	Security, lights, social life, safety
7	Mobility	7.4	Public transport (near and frequent) time to destination

is to move around the area and this is therefore labelled “accessibility”. The third one deals with people who live and work in the area. In addition to this, it also includes items about cleanliness and aesthetics, all of which reflect that people are not only living in the area but also taking care of the area. Thus, this is labelled “liveability”. The fourth factor includes items about noise and since satisfied people also wanted low levels of noise, this is labelled “calmness”. The fifth factor is labelled “recreation” although cycling could have other purposes. Nevertheless, in this instance, when it is combined with resting places and public places such as parks, it appears to describe an area for recreation. The sixth factor clearly deals with different means aimed to protect its citizens. In this instance, social life can mean that the area is not deserted and other people can therefore also act as a “protection”. Finally, the seventh factor included items about public transport, and this is therefore labelled “mobility”. The results also showed that the factors labelled “opportunity” and “accessibility” explained 23% of the variance.

The conclusion which could be drawn from this exercise was that a number of different aims had been fulfilled; the toolbox had been carefully tested; it was clear and reflected important components, each indicator was independent from each other and various domains that are important for urban QoL were included.

The final instruments to assess urban QoL comprise four different parts. The first part focuses on general information about the interviewees (gender, age, mobility habits, etc.) as well as information regarding the context in which the interview takes place (season, hour, location, etc.). The second part assesses general satisfaction with the area. In the third part, respondents are asked how satisfied or dissatisfied they are with a number of conditions (i.e. urban quality indicators). Finally, in the fourth part, they are asked to rate the importance of the same conditions. In addition to this, additional questions may be added which concern situational specific conditions not included in the (general) instrument that are considered to be relevant for the specific situation (e.g. we included a question on the cycle lane in our pilot study). If the instruments are used to assess QoL effects of a specific policy, we suggest the selection of additional indicators together with inhabitants.

10.6 CONCLUSION, PRACTICAL VALUE OF THE QoL INSTRUMENTS AND POLICY IMPLICATIONS

The ASI project aimed to examine to what extent QoL issues are considered in traffic and urban planning and the way they are dealt with in projects aiming to promote sustainable transportation. Although there is great consensus among experts and practitioners in the fields of land use and transport about the importance of evaluating the effects of policies on QoL, QoL issues tend to be overlooked in current practices. QoL issues are being considered mainly at the beginning of projects, but much less during the progress of the project. Many experts and practitioners experience significant difficulties with evaluating QoL effects of policies because no general concept or operational definition of QoL is available at the moment. A complicating matter is that experts have different disciplinary backgrounds (e.g. architecture, town planning, transportation planning, civil engineering, economics), each associated with different, and sometimes divergent, ideas on and definitions of QoL. This not only hinders communication on this issue but also

the development of suitable instruments to assess QoL. Only a few social scientists are working in this field. This is remarkable since social scientists have studied QoL issues for quite some time now and could play an important role in developing relevant instruments. Experts in the fields of transport planning and urban design believe that tools for assessing QoL effects of policies could be beneficial for them.

Common practice mainly focuses on measuring objective conditions, reflecting experts' point of views. However, assessments of objective conditions may differ from subjective judgements, that is, aspects that are believed to enhance QoL do not necessarily improve citizens' perceptions of QoL. Thus, measuring objective conditions only does not provide valid information on what supports or deteriorates QoL. For this reason, it is important to assess QoL subjectively as well, as this reveals to what extent people are actually satisfied with their life.

The final toolbox comprises an instrument to assess effects of policies on QoL in general (Section 10.4) and instruments to assess effects on urban QoL and QoL related to traffic and transport (Section 10.5). These instruments enable decision-makers to better address QoL issues in land use and transport planning, in order to secure public acceptance and promote user behaviour changes. For example, by combining users' evaluation of the importance of urban quality indicators and their satisfaction with the particular indicators (Figure 10.8), policy-makers may identify issues that need further attention and which issues have been addressed sufficiently. Many land use and transport planning policies are aimed at promoting user behaviour changes. Such behaviour changes will be more easily accomplished if the particular policy improves their QoL. The instruments also facilitate participation of affected (groups of) citizens in public planning and assessment, and, consequently, appropriate consideration of user needs.

The instruments comprise a key set of indicators to be used in every context. Of course, such a general set of indicators may not capture all aspects relevant for a particular policy. Therefore, if needed, the general set of indicators can be enriched by project-specific indicators. Toolbox users can either select additional indicators from a list of suggested indicators or develop new ones. Clear implementation guidelines were provided on how to use the instruments in order to end up with reliable and valid assessments of (expected) effects of policies on QoL.

Ideally, the QoL indicators are assessed objectively and subjectively, before and after policies are implemented, via user and expert interviews. Of course, user perceptions may be biased and based on insufficient information on the project. However, since QoL evaluations are subjective by nature, it is still important to collect information on user perceptions. Of course, perceptions may change (and become more accurate) when users are informed about the aim and (intended) outcomes of policies. To collect valid (unbiased) data, to be able to compare results of different toolbox application, to learn from previous experiences and to forecast possible effects of policies, it is important to measure at least the key set of QoL indicators and to follow the general guidelines as indicated in the toolbox. By doing so, a databank concept can be developed in which comparable data on QoL assessments are put together. This databank may improve the basis for practical work, since policy-makers can build on experiences in previous

projects. Together, these data provide a detailed overview of how various policies may affect individual QoL and what may be done to (further) improve QoL.

A sufficient number of users have to be interviewed in order to derive statistically meaningful results. If disaggregated analysis (for instance by age group or gender) is desired to compare user needs and desires, larger samples are needed. Interviews with users may be made “on the spot” with people moving around in the area of interest. This may yield selective samples, but at least one will collect views of those actually experiencing the consequences of the policy at hand. In many cases, this procedure is more feasible than random selection of a sample because the latter may be too time consuming. However, if one is particularly interested in collecting opinions and perceptions of the population in general, a random sample should be strived for. It is suggested to ask respondents to fill in the questionnaire and return it in a pre-stamped envelope. Selection of experts to be interviewed should be based on their involvement and/or interest in the development and implementation of the project to be assessed.

The acceptability, effectiveness and efficiency of policies may be enhanced by systematically assessing (possible) QoL effects before and after implementation of such policies. By administering the instruments included in the toolbox before a policy implementation is taking place, it can help policy-makers to identify which aspects of life are in need of improvement. Further, this will reveal how – and to what extent – policies may affect the QoL of citizens, and what may be done to reduce, prevent or compensate possible negative effects (and optimise positive ones). The needs of various groups in society can be better understood, including the needs of specific (vulnerable) groups. By paying due attention to the results of QoL assessments before a policy is implemented, the policy is more likely to become acceptable, effective and efficient.

Employing the QoL instruments after policies have been implemented will reveal to what extent policies have improved QoL. If not, policy-makers may adjust policies or implement additional supportive policies. Comparisons can also be made between objective and subjective indicators, revealing to what extent objective improvements affect perceived QoL. User evaluations are important to supplement expert evaluations and perceptions because expert opinions may not be accurate. The toolbox can be used for benchmarking, by comparing QoL in different cities, regions and countries. This once again illustrates the need for administering all instruments included in the toolbox and measuring all key indicators listed rather than changing the list of indicators for each specific policy situation. We hope the toolbox will help practitioners to develop plans that will improve QoL of citizens in the intended way.

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