WalkUrban

Walkable Urban Neighbourhoods

Freeing up Potential for Sustainable and Active Travel by Improving Walking and its Connections with Public Transport

ILS Research gGmbH

COMUNE DI GENOVA

UNIVERSITY OF GÄVLE

UCL

PROJECT ABSTRACT

In many urban neighbourhoods, the private car is still the dominant transport mode, causing many problems, such as congestion, air and noise pollution, greenhouse gas emissions, traffic accidents and the inefficient land use of driving infrastructures. In contrast, walking is a zero-emission transport mode, feasible for most people and enhances individual health and well-being. If more people used their own feet for short trips in combination with public transport, it has the potential to support low emission transport, to reduce car dependencies and increase social equity and inclusion for those who cannot afford a private car.

The overall goal of WalkUrban is to come to a better understanding of urban walkability and local accessibility in order to free up the potential for walking.

The project combines quantitative and qualitative methods through innovative analyses of objective and perceived walkability as well as walking-related attitudes and travel satisfaction. It aims to identify key drivers for and obstacles to walking in different urban neighbourhoods.

The research is conducted in close collaboration with local stakeholders in three European cities (Genoa, Dortmund and Gothenburg) and aims to identify local solutions for improving overall walkability alongside general recommendations for a pedestrian centred urban environment.

AIMS

- Better understand walkability by identifying supporting and hindering factors for walking
- Co-create and improve current methods for walkability assessments
- Explore links between objective and perceived walkability
- Provide policy recommendations on how to improve the walkability in urban neighbourhoods.

INVOLVED CITIES

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Genoa is the capital city of the Liguria region, located in the north-west of Italy. Through its urban planning the city has become car-oriented, and use of cars and motorbikes is extensive. The transport planning priorities are increasing public transport use, as well as promoting sustainable modes such as cycling and walking.

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Dortmund is located in the Ruhr region, a former highly industrialised area in western Germany. Traditional car-oriented urban planning and intensive car use pose a challenge for a transition towards sustainable mobility. Nevertheless, the city's new mobility plan aims to strengthen walking, cycling and public transport and to change the modal split.

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Gothenburg is Sweden's second largest city, located on the west coast with a history being an industrial and maritime city. The urban planning favours both public transport and cars. The vision is to become a green, sustainable, attractive, and cohesive city, and to reduce carbon dioxide emissions by reducing car use in the city in favour of other modes of transport.

NEIGHBOURHOODS STUDIED

In each of the three cities taking part in the project, Genoa, Dortmund and Gothenburg, two neighbourhoods were chosen as case study areas. The criteria were that the area should be: walkable for residents; located within the urban limits of the city; close to public transport links to the city centre; within 10-15 minutes' walk to points of interest and amenities such as schools, shops, leisure facilities; and have a population of over 5,000.

The similarities between the case study areas allowed for comparisons within and between them. WalkUrban aimed to select one 'general middle-income neighbourhood' in all three cities, and one 'diverse lower income neighbourhood' with a different built environment.

Based on an initial selection of suitable neighbourhoods by the WalkUrban researchers, the final selection of two neighbourhoods was conducted in close collaboration with local stakeholders. The analyses were first carried out in Municipio Medio Ponente District, one of the two case studies in Genoa, as a pilot case, and were then replicated in other cities.

Genoa

Medio Ponente is a historic urban neighbourhood located on the western suburbs of Genoa, but not too far from the city centre. It is characterised by a densely built and populated urban structure (about 58,000 people), with many restaurants, cafes, shops, and several schools. There is a concentration of workplaces due to the historic maritime industry and other connected companies.

Centro Est is centrally located and includes a portion of the historical centre and a dense urban structure with many services, schools, restaurants, shops, and the main railway station. The neighbourhood is mostly residential but is close to the city centre and well served by public transport. The population is about 85,000.

Dortmund

Westfalenhalle is a residential urban neighbourhood located close to the city centre and in the west of Dortmund. It is characterised by an historic, densely built urban structure with many restaurants, cafés and shops, and two primary schools. It is served by several public transport lines are within walking distance. The population is over 7,000.

Funkenburg is an urban neighbourhood located in the east of Dortmund, a bit further from the city centre. It is a mixed neighbourhood close to an industrial area with some shops and two primary schools. There is a tram station and several bus lines – there is one suburban railway stop located in an adjacent district. The population is over 7,000.

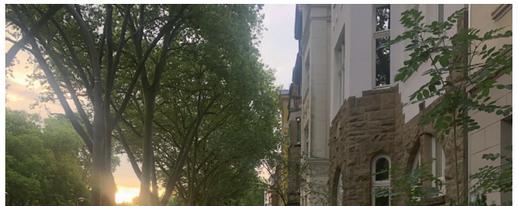
Gothenburg

Södra Kortedala is an ethnically diverse suburb of just over 10,000 people. It is a classic mid-century Swedish suburb, nearly entirely consisting of multi-family housing, with a mix of low-rise blocks and high-rise towers and large spaces between the buildings, green spaces or car parking. The pedestrianised centre is connected to the neighbourhood by foot paths and roads and hosts a number of different amenities. The area is connected to the rest of the city by public transport and roads, and it is bordered by nature areas/woods.

Kungsladugård is a neighbourhood suburb of just under 11,000 people. The northern parts have mainly 3-4 story multi-family apartment blocks, with shared gardens. Through this part runs two wide tree lined boulevards with tram lines, shops, cafes, and other amenities, which meet at a large roundabout where the school lies. To the south, the apartments give way to row houses and villas. It also sits between two large green areas and is bordered to the northeast by a large highway.

PHOTOS OF THE NEIGHBOURHOODS





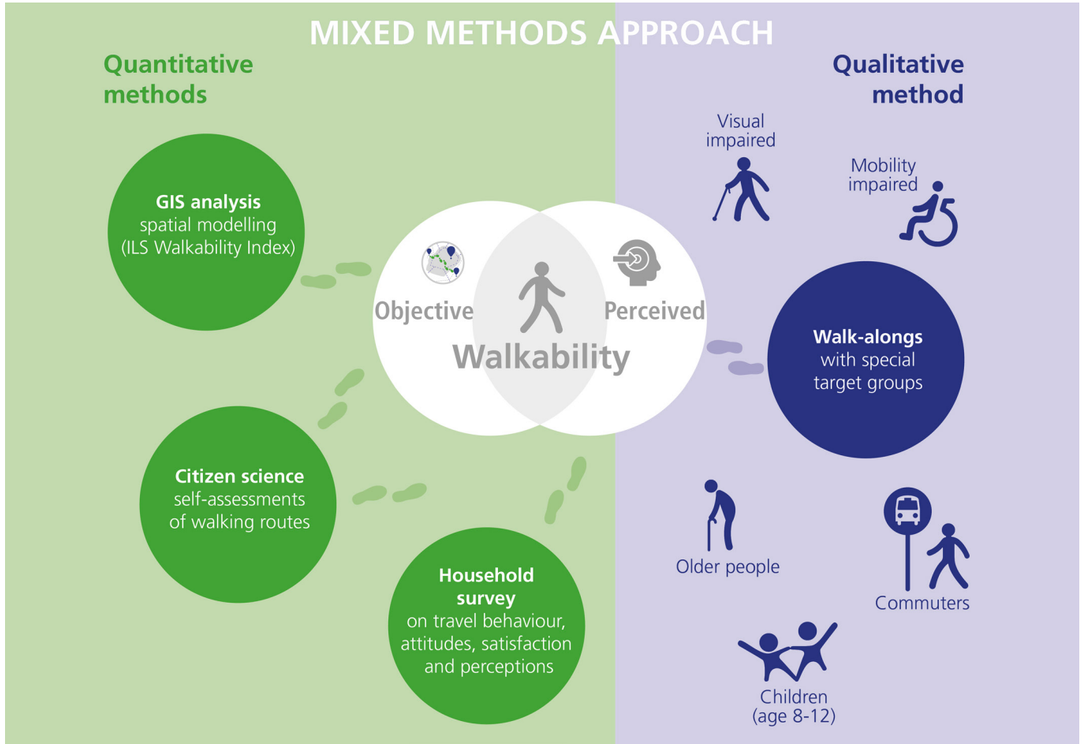

MIXED-METHODS APPROACH

To come to a better understanding of walkability the project aims to identify supporting and hindering factors for walking, both as a single mode of transport and in combination with public transport This means looking at the most important aspects of objective and perceived walkability as well as walking-related attitudes, travel satisfaction and local walking cultures.

The project combines quantitative and qualitative research methods (see figure below). To calculate objective walkability, we carried out GIS based walkability analyses using an open-source assessment tool. To understand how people perceive walkability in the six selected neighbourhoods, we conducted a household survey on travel behaviour, attitudes, motives, satisfaction, and perceptions. In addition, we applied two further methods to conduct street level assessments.

These helped us to understand how people perceive the built environment in-situ, and which factors positively or negatively affect them while walking. The first is based on citizen science where we developed an online tool citizens could use on their smartphones to self-assess their walking routes. The second was walk-along interviews with different target groups such as school children, disabled and older people, to understand the walking needs of vulnerable people.

All four methods were applied in each of the six neighbourhoods in the three case study cities.



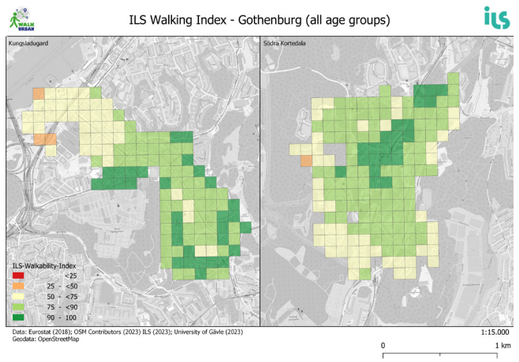
Mixed method approach used for WalkUrban (diagram © WalkUrban/ILS)

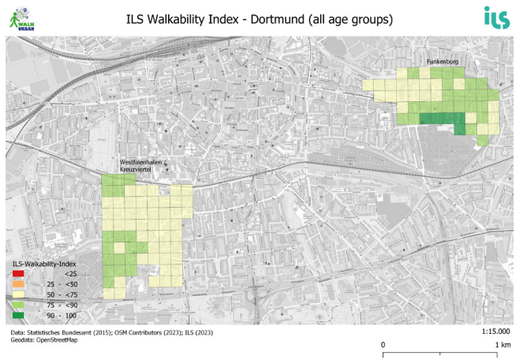
GIS-based accessibility and walkability analysis

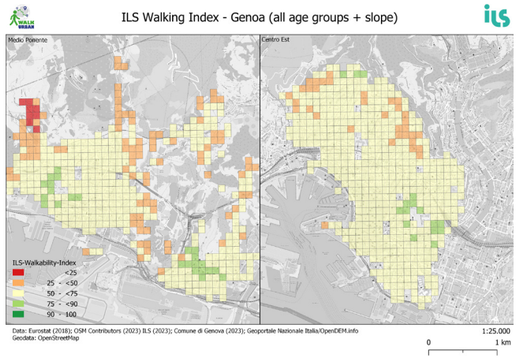
The potential walkability of an urban neighbourhood is influenced by various factors e.g., by the natural and built environment, the pedestrian infrastructure, and the distances to/the accessibility of important destinations. These factors can be assessed using geographical information systems (GIS) which make use of spatial data. Results of such GIS-based walkability analyses show the objective or calculated walkability of selected areas.

For each of the six WalkUrban neighbourhoods we calculated scores with the ILS-Walkability-Index. The residential homes are represented on a small scale by 100m*100m grid cells. Data from OpenStreetMap (OSM) and OpenRouteService (ORS) is used within three modules: 1) for estimating the proximity to services and amenities e.g., supermarket or school; 2) for calculating density and permeability of the pedestrian street-network around each home, and 3) its coverage with greenery. These modular assessment results are weighted, summed up and scaled for a final index-score with a maximum of 100. Higher numbers indicate better potential walkability. The range is colour coded for map display from low to high scores, which represent residential locations with high car-dependency (red) to (very) good walkability (green).

The calculated walkability result for each neighbourhood is displayed in the maps to the right: Gothenburg has the highest greenery coverage and dense pedestrian networks. Both neighbourhoods have high scores i.e., a good walkability (average around 82). Dortmund follows with averages of 74 (left) and 79 (right), here destinations can be reached more easily, but green coverage is lower than in Sweden. Genoa shows the lowest averages with 58 (left) and 64 (right) for the larger district areas, despite of its rather dense pedestrian network. The lower walkability is partially due to (very) low scores on the edges and mainly due to the majority of cells with middle scores between 50-75 (yellow). Only a few cells show good objective walkability, they normally represent areas within a higher greenery coverage and shorter distances to services.







(all maps © WalkUrban/ILS)

1. This open-source walkability assessment tool was developed specifically for urban neigh¬bour-hoods using open-source spatial data via a QGIS plugin. Schmitz, J., Fina, S., & Gerten, C. (2023). Wie fußgängerfreundlich sind deutsche Großstädte? Neue Ergebnisse aus der Walkability-Forschung. Raumforschung Und Raumordnung | Spatial Research and Planning, 1–15;

Fina, S., Gerten, C., Pondi, B., D'Arcy, L., O'Reilly, N., Vale, D. S., Pereira, M., & Zilio, S. (2022). OS-WALK-EU: An open-source tool to assess health-promoting residential walkability of European city structures. Journal of Transport & Health, 27, 101486.

Survey on walking behaviours

The household survey was performed in all six the selected neighbourhoods. The data was collected in the second half of 2022 through online household surveys. Prior to data collection the survey was pilot tested in Germany and Sweden and revised accordingly. The online survey had five parts and was developed in English and then translated into German, Swedish, and Italian, respectively. The first part, on general travel behaviour, asked for information regarding respondents' travel options, while the second part focused on their travel patterns. The third part focused on perceived walkability, walking motivations and attitudes, while the fourth part took a closer look at the respondents' most recent walking trip including questions regarding circumstances and travel satisfaction. The final part collected the respondents' socio-demographic information.

The invitations to participate were distributed using different approaches for each country. In Dortmund, all residents of the selected neighbourhoods were invited through flyers posted through their letterbox with instructions for online participation. In Genova invitations with links to the online survey were sent out via the Municipality of Genova´s social media channels and by emails to employees of relevant companies and schools in the areas. In Gothenburg, a third party (Origo group) distributed postcards with instructions for online participation to a random selection (50% of the households) in the two neighbourhoods. In Gothenburg, reminders were sent via postcard or mobile text messages. In the end, 1,103 respondents completed the survey. The socio-demographics of respondents and spatial context of neighbourhoods are presented below.

Average age (years)		46.3
Gender	Women	52.2%
	Man	47.8%
Car ownership	0	31.5%
	1	53.9%
	>1	14.6%
City of residence	Dortmund	470 (42.3%)
	Genoa	210 (19.0%)
	Gothenburg	423 (38.3%)

In the survey we introduced the Short Perceived Walkability Scale (SPWS), a compact and convenient scale to measure perceived walkability. The SPWS asks respondents to what extent they agree on 15 statements regarding perceived walkability in their neighbourhood when (1) walking recreationally, (2) walking to their destinations, and (3) walking to public transport (PT) stops (see below).

PERCEIVED RECREATIONAL WALKABILITY

It is feasible to walk recreationally
It is convenient to walk recreationally
It is comfortable to walk recreationally
It is pleasant to walk recreationally
My neighbourhood stimulates me to walk recreationally

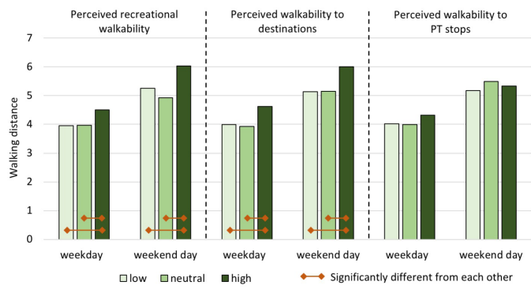
PERCEIVED WALKABILITY TO DESTINATIONS

It is feasible to walk to my destinations
It is convenient to walk to my destinations
It is comfortable to walk to my destinations
It is pleasant to walk to my destinations
My neighbourhood stimulates me to walk to my destinations

PERCEIVED WALKABILITY TO PT STOPS

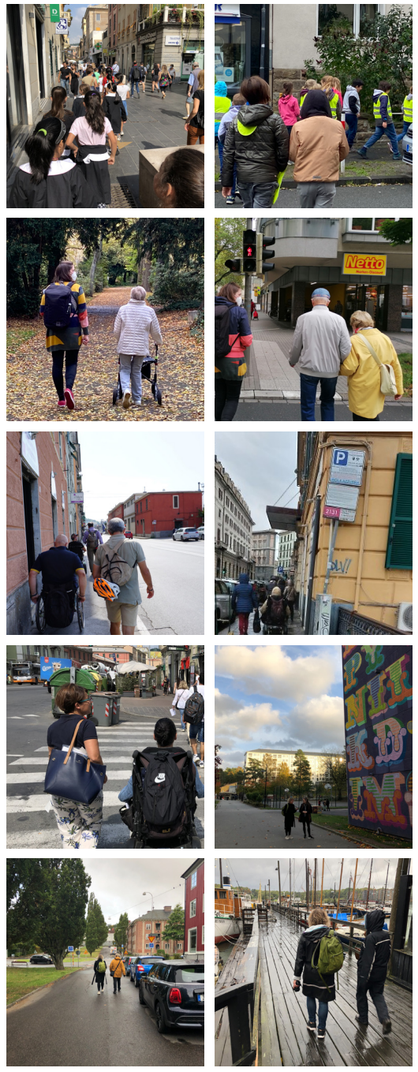
It is feasible to walk to PT stops
It is convenient to walk to PT stops
It is comfortable to walk to PT stops
It is pleasant to walk to PT stops
My neighbourhood stimulates me to walk to PT stops

Results show that the three types of perceived walkability are mainly affected by walking attitudes and to a certain extent by the spatial context (city and type of residential neighbourhood). Respondents with higher levels of perceived walkability also walk more often, and walk for longer a time and distance, although variations occur depending on the type of perceived accessibility and purpose of travel. Perceived walkability to public transport stops only seems to influence walking to public transport. Perceived recreational walkability and perceived walkability to destinations seems to have significant effects on the number of walking trips, their distance, and their duration. The figure below indicates that respondents with high levels of perceived recreational walkability and perceived walkability to destinations walk longer distances (both on weekdays and in weekends) compared to those with low levels of perceived walkability.



Walk-along interviews

The qualitative method of walk-along interviews allows for the investigation of people's perceptions during an interview while walking. We used walk-along interviews, to analyse how members of vulnerable target groups experience their local worlds and how these affect their walking perceptions and their walking behaviour. We intended to find out if the needs of different target groups differ regarding feasibility, comfort, convenience, pleasure, and stimulation of walking. In each city, two different target groups were investigated. Schoolchildren were the common target group investigated in all three cities.



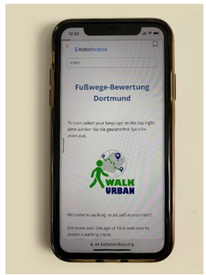
The other target groups (older people, disabled people, and commuters) were selected to include aspects of diversity and vulnerability following recommendations from local stakeholders and city policy documents. The interviews were conducted in the local language, recorded with a voice recorder and photos were taken to document promoting and hindering aspects of walkability. Some were one on one interviews, and some were group interviews. The walk-alongs were designed according to the expected different needs of each target group regarding different communication and understanding levels and depending on possible physical restrictions and the overall comfort of the participant.

The results indicate that the four target groups have different hindering and promoting factors for walking. School children in all three case studies emphasise the nature and green infrastructure (e.g., trees, animals, and flowers) as conducive to walking. Issues related to a lack of cleanliness, such as dog waste and rubbish, and narrow pavements are hindering factors primarily in Dortmund and Genoa. Interestingly, besides green infrastructure and architecture, cleanliness appears to be a promoting factor for school children in Gothenburg. The topic of traffic safety was prominent in all cities, and the following issues were raised: the green phase of a crossing light being too short, difficult road crossings, high traffic speed, and forced detours due to on-street parking and safety concerns due to other people and dogs.

In Dortmund older people were the second target group, and they perceive green spaces, social contacts and health aspects as supporting factors to walking, for example, they enjoy watching small animals and flowers in a park. Like school children, traffic safety issues were also considered as the key obstacle for pedestrians because of short green traffic light phases, high traffic speed and uneven and narrow footpaths leading to a risk of tripping. In Genoa, walk-alongs were conducted with people with various disabilities. In particular, socialising or getting groceries were motives for walking. Similar to the school children' remarks, lack of cleanliness was a negative factor as waste can stick to the wheelchairs, as were structural barriers such as high kerbs. Therefore, the removal of these issues would be an incentive for them to move around more. In Gothenburg, commuters' experiences show that the ability to adapt to weather, positive effects on health and opportunities to socialize were incentives for walking, whereas the public transport being "too good" and safety concerns were typical barriers.

Citizen Science Walking Route Assessments

Following the principles of citizen science, where citizens are involved in research activities, we developed a tailor-made method for residents and local stakeholders to assess their walking routes in our three case study cities. This quantitative method aims at a greater understanding of local walkability and individual perceptions of walking routes. Professional and freely available field data-collection software, KoBoToolbox (www.kobotoolbox.org) was adapted for this purpose. Participants selected their individual walking route(s), stated their travel purposes and destinations, and carried out the assessments by filling in a short questionnaire. The participants stated if their walking route was feasible, comfortable, convenient, pleasurable, and stimulative and indicated positive and negative environmental aspects on their walking routes. For the start and end points of each walking route and of places where they took photos, voluntary GPS locations were recorded. Approximately 90 citizens, mainly from Genoa and Dortmund, used the tool on their smartphones, and participated in the fieldwork by self-assessing the walkability of their neighbourhoods. For example, regarding the feasibility of walking, pavement conditions, barrier-free aspects and obstructions from on-street parking influenced their walking in a negative way.



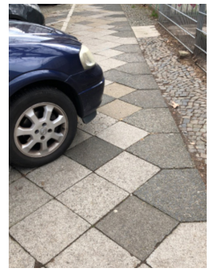
KOBO TOOL

UNEVEN PAVEMENT

BROKEN PAVEMENT

SELF-ASSESSMENT

PAVEMENT INVADED BY ON-STREET-PARING



SMALL GARDEN PROTECTING FROM ROAD TRAFFIC

PAVEMENT WITH GREENS

41 % of the participants in Dortmund and 47% of those in Genoa say that the condition of pavement is not good. They are particularly negative about the uneven surface caused by missing bricks, cracks and holes resulting from tree roots, and broken asphalt surfaces. More than a half of the participants in Dortmund state that the pavement has not got enough space for walking since on-street parked cars invade the pavement area. These parked vehicles are also perceived as one of the main obstacles to crossing the street easily. Furthermore, the cleanliness of walking routes has a significant influence on people's walking perceptions - only one fifth of participants in Genoa and less than one third of participants in Dortmund said, 'my walking route is clean and tidy'. This result is echoed in comments recorded during the walk-alongs on the presence of dog waste and rubbish on streets. In Dortmund some positive opinions are found when people are asked if their walking experience is pleasant. 44% answers positively as they found nice vegetation and green space on their walking route as well as no or only little traffic noise. In Genoa, half of people find it easy to cross the roads as there are enough traffic lights and zebra crossing. In such a situation, it is evident that people perceive that streets are designed for pedestrians. The citizen-science data collection enabled us to identify detailed issues at the street level with photographic evidence provided by residents. These aspects are contrasting results from the household survey that captures an overview of the walkability in the three cities.

POLICY IMPLICATIONS

Our policy implications and transferable lessons are drawn from our key findings, as well as our recurring discussions with both stakeholders and at conferences (such as our final conference, with 40 attendants including experts and practitioners from all over Europe).

Use a mixed methods approach to get the full story of walking experiences

- Walk-along interviews and walking route assessments can show us people's experiences of walking, such as how they feel or why they notice particular things in certain spaces. Such a degree of detail and spatial reference is not captured through household surveys alone.
- A walkability index based on the average person provides a good overview for a city or a neighbourhood. Walkability indices for target groups can be developed to address their specific needs.

Make stakeholder involvement a part of the entire research process

- The selection of target neighbourhoods and groups for case studies should be discussed and decided in collaboration with local public authorities and other stakeholders at an early state of the project.
- Key steps and findings should be thoroughly communicated with stakeholders to facilitate knowledge exchange and public outreach.

Raise awareness of walking through effective communication

- Behavioural change and awareness raising can be encouraged via methods such as partnering with local schools, or temporary street design experiments.
- Effective communication is needed with the general public and vulnerable groups. Collaboration between different groups holistically raises the awareness of walking, for example knowledge exchanges between children and older people.
- Walking can be promoted as a safe alternative for travelling to school, for example a 'walking bus', or 'Pedi-bus', where a group of children could be accompanied by parents, schoolteachers, or senior citizens as they walk a set route to school.
- Walking is the basis of most human activities and people value its benefits to their health and fitness. Walking should be advocated, especially by health professionals.

POLICY IMPLICATIONS

Local political support is crucial

- Political will is key to effective local actions and to creating sustainable organisational structures for successful implementations.
- A holistic strategy is needed to ensure all needs are met fairly. There are many approaches to street design and differences can exist between institutions, such as planning, engineering and transport departments.
- Accurate and frequently updated data is useful as it can provide concrete evidence in political discussions.
- Often only a small portion of a budget is allocated specifically for pedestrian infrastructure. Budgets allocated to other transport modes should also be used for improving walkability. For example, proper parking enforcement can improve people's walking experience.

Small changes to streets remove barriers to walking

- Tree-lined streets and small green spaces can improve the walking experience, especially in high-density areas when there is a lack of large parks.
- Give priority to pedestrians, for example by making crossing light phases long enough for older people to cross.
- Allocating more space to pedestrians creates a more pleasant, safe and overall better environment for walking.
- Obstacles on pavements can be removed at a lower cost than building new pedestrian infrastructure, for example by repairing the pavement surface. Here the needs of vulnerable people should be considered first, for example by prioritising streets around schools or nursing homes.
- It is important to establish funding possibilities for future changes. Investment is needed for permanent changes supported by effective and comprehensive implementation.

PROJECT PARTNERS

ILS Research gGmbH – Germany

ILS Research in Dortmund specialises in in the field of urban mobility research with a focus on the active mode accessibility and stakeholder involvement through living labs and co-creation approaches.

Comune di Genova - Italy

Genoa Municipality develops European projects in cooperation with different public and private entities aimed to the valorisation of the territory and its potential. Sustainable development, energy, mobility, urban regeneration, cyber security, governance, social inclusion and security are the main sectors in which the Municipality develops EU projects for the improvement of the city.

University of Gävle - Sweden

The University of Gävle on the east coast of Sweden focuses on four strategic research areas which tackle societal challenges, including interdisciplinary research on Urban sustainability.

University College of London – United Kingdom

University College London (UCL) is a public research university in London, England. It is the second-largest university in the United Kingdom by total enrolment and ranked as one of the top universities worldwide.

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