



BOOK OF PROCEEDINGS

INTERNATIONAL CONFERENCE SUSTAINABLE MOBILITY

5-6 MARCH

2026

The INTEC International Conference brings together academics, researchers, policymakers and industry experts to discuss innovative approaches and collaborative solutions for a sustainable future in engineering and mobility. The conference will be hosted by POLIS University in Tirana, Albania, and co-organized by partners from across the EU as part of the Erasmus+ CBHE Project 101081873-ERASMUS-EDU-2022-CBHE-STRAND-2.



INTEC International Engineering Competence Centres to push sustainable mobility development in Albania and Montenegro
Project Reference: 101081873-ERASMUS-EDU-2022-CBHE-STRAND-2

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Project Partners:



INTEC International Conference
February 2026
POLIS University, Tirana, Albania

INTEC>>>



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February 2026
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LINKING MORPHOLOGY, PERCEIVED SAFETY, AND SUSTAINABLE MOBILITY IN POST-SOCIALIST URBAN CONTEXTS

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Abstract

Many post-socialist cities have undergone rapid urban transformation, often reshaping public space and everyday mobility. Fragmented growth, privatization, and weak spatial regulation have changed how people perceive and use the urban space. These changes affect walking behavior, especially through perceptions of safety as a condition for the usability of public space. While in the contemporary context research often focuses on infrastructure and innovation, the role of perceived safety as a condition for mobility is currently underexplored. This study examines how urban morphology influences perceived safety and, in turn, everyday mobility patterns. The study is based on a qualitative and spatial analysis of Astir neighborhood in Tirana, Albania. Methods combine field observations of pedestrian movement, morphological analysis, and interpretation of perception-based data previously collected in empirical research. The morphological analysis focuses on permeability, visibility, and enclosure and relates these attributes to observed walking routes and avoided areas. The analysis highlights some core insights: Walking patterns concentrate along public spaces that offer clear spatial structure and higher levels of activity. Streets that lack continuity or legibility are often avoided. Perceived safety emerges as a key component, linking urban form and mobility behavior. Different user groups have various levels of sensitivity to these conditions, based on their specific needs in public spaces. The study argues that increased perceived safety can lead to more active mobility behavior without large interventions in the urban space. By linking urban morphology with perception and everyday movement, the study positions perceived safety as a critical component of sustainable mobility transitions in post-socialist cities.

Keywords: perceived safety, urban morphology, everyday mobility, public space, post-socialist cities

I. INTRODUCTION

Modern urban policy emphasizes sustainability as a core approach to development. Sustainable mobility, as part of a broader sustainability framework, is strongly linked to climate targets, public health, and social equity. Academic and policy debates tend to frame mobility transitions through infrastructure or technological innovations, with a focus on efficiency, cost minimization, emissions reduction, and social equity (Banister, 2008; Geels et al., 2012; Litman, 2002). Meanwhile, walking is almost universally considered a sustainable transport mode (the original mode of transport). Still, it is often assumed to be an outcome of good pedestrian conditions in urban space.

Everyday mobility practices show a more complex reality. People do not simply walk because sidewalks exist, or because their destinations are within walking distance. Instead, people decide to walk because of how they perceive or experience the public space. Feelings of safety (as perceived when deciding to use public space), comfort (while being in public space), and spatial clarity (the quality of the pedestrian environment overall) strongly influence decisions to walk, the route choice, and the duration of trips (Ewing & Handy, 2009; Southworth, 2005).

“Urban design qualities are different from qualities such as sense of comfort, sense of safety, and level of interest that reflect how an individual reacts to a place – how they assess the conditions there, given their own attitudes and preferences. Perceptions are just that, perceptions. They may produce different reactions in different people. They can be assessed with a degree of objectivity by outside observers; individual reactions cannot” (Ewing & Handy, 2009).

These problems are especially observed in post-socialist cities. Since the early 1900s, Southeast European cities have undergone rapid transformation – a combination of privatization of land, informal construction, and uneven regulatory control (Stanilov, 2007; Hirt, 2012). These processes have transformed public spaces and urban morphology, often resulting in fragmented street networks and weakly defined spaces. Although many neighborhoods are physically walkable, they would often not be defined as walkable by indicators for different user groups, since everyday movement is often accompanied by discomfort.

Safety research, in terms of experiential conditions, is gaining more attention. Safety is commonly approached through traffic accidents or crime statistics and crime prevention, while perceived safety as a spatial experience remains underexplored. In this context, perceived safety is understood as a precondition for usability of public space, meaning that it is a key factor in attracting people to use it. In the case of mobility, perceived safety influences what areas people are drawn to and which public spaces they avoid.

This study suggests that perceived safety acts as a mediator between urban form and mobility behavior, illustrated through a representative neighborhood in Tirana. The contribution lies in repositioning perceived safety within sustainable mobility debates and demonstrating its relevance for post-socialist urban contexts.

II. METHODS

The study uses a qualitative and spatial analytical approach. It is based on empirical material collected during the author's previous research in Tirana. These data are used selectively and interpreted from a mobility perspective to understand behavioral responses to spatial conditions. The material here addresses the research question of how perceived safety affects everyday mobility.



Figure 1. Astir neighborhood. Source: Author.

The neighborhood of Astir, in the Administrative Unit 14 of Tirana, was selected as a representative case. The area reflects typical rapid urbanization, which happened in the late 90s – early 2000s, and is still undergoing transformation today. Dense high-rise residential development, mixed land uses, informal extensions, and fragmented public space are typical here. In fact, most of the dwellings in the neighborhood were initially informal, which were later legalized under the new laws of 2005 for single-family dwellings and 2014 for multi-family dwellings (Kacani, 2024). The neighborhood is a mix of designed public spaces and underdeveloped areas, with a very dense population, making it suitable for examining physical accessibility and actual mobility behavior.



Figure 2. Contrasting conditions of public space. Source: Author (2025).

The study has three analytical components:

- a) Spatial analysis of the street network to look at permeability, connectivity, and block structure.
- b) Field observations documenting walking routes, areas of high pedestrian presence, avoided streets, and movement speed.
- c) Perception-based insights derived from earlier surveys and observations are interpreted as mobility behavior indicators, such as avoidance, detours, etc.

Although some of the empirical material originates from observations of children's mobility, these findings are interpreted here only as sensitive indicators of perceived safety, reflecting more general mobility constraints of vulnerable users (Hillman et al., 1990).

III. RESULTS

1. Urban morphology and permeability

The spatial analysis shows the area to have relatively high spatial permeability, small blocks, and multiple connections between destinations. From a strictly morphological perspective, this would indicate a good environment for walking. This assessment is based on street network analysis, focusing on block size, connectivity, and whether alternative paths are present.



Figure 3. Spatial permeability in residential blocks. Source: Author.

However, in practice, several connections are narrow, visually blocked, or disrupted by parking, fences, or vacant lots, which weaken spatial continuity and make routes less legible – the car street becomes the space for walking (Figure 4). Despite many paths, only a few are consistently used. This shows that physical access is not a sufficient condition for mobility outcomes.



Figure 4. Streets' conditions that constrain pedestrian movement. Source: Author (2025).

2. Walking patterns and preferred routes

Observed walking patterns indicate that people concentrate on specific streets – not necessarily the shortest route, but the ones perceived as safer and more comfortable. In terms of physical

300

attributes, this means permeable building fronts, moderate enclosure of space, and active or semi-active ground floors. This was not observed everywhere; courtyard configurations supported higher levels of mobility due to their enclosed form and multiple building passages that they offered, as opposed to linear layouts, as shown in Figure 5. These streets support social visibility and “natural surveillance” (Jacobs, 1961), which increases perceptions of safety. This means that pedestrians move at varied speeds and have greater exposure to public space. On the contrary, streets with blank façades or undefined edges are mainly used as transitional spaces, where pedestrians don’t stop, or they walk faster. Similar patterns have been identified in studies linking urban design with walkability (Ewing & Handy, 2009; Southworth, 2005).



Figure 5. Active and permeable ground floors enabling circulation. Source: Author.

Route choice is strongly influenced by perceived safety. This is why pedestrians avoid areas with no visibility or sudden changes in scale, poor lighting, and empty open spaces. Even when there is no recorded crime, such spatial cues can create discomfort (Nasar & Jones, 1997), leading to detoured or avoided walking trips. This leads to overall lower active mobility levels.

3. Vulnerability and inclusive mobility

Patterns of vulnerability emerge clearly from these observed mobility patterns, with elderly people, women, and those moving with dependents (children, people with disabilities, etc.) showing

greater sensitivity to spatial conditions. Earlier observations show that children's independent mobility was restricted in the same areas that other vulnerable users tend to avoid. These areas were mostly avoided due to concerns about traffic, poor lighting at night, lack of social presence, and unclear boundaries between public and private spaces.

On the other hand, gendered experiences are worth mentioning. Open spaces with weak edges, especially linear configurations, were mainly occupied by males, while females tended to use mostly enclosed spaces, where they could both see their surroundings and be seen by others. Valentine (1989) speaks of women's spatial behavior through a lens of fear, saying that women's use of space is a spatial expression of patriarchy. This can be understood as a reflection of socially differentiated norms and practices that influence how women and men engage with public space.

These patterns imply that environments that discourage vulnerable users from using public space also undermine walking as a mainstream mode of mobility. Therefore, spatial conditions that support those who are most vulnerable to perceived risk are necessary for inclusive mobility.

IV. DISCUSSIONS AND CONCLUSION

The findings of this study demonstrate that infrastructure is not the only determinant of everyday mobility. Rather, the perception and experience of urban space matter. Walking patterns in the studied neighborhood were not mainly driven by distance or network density, but rather by perceived safety, spatial legibility, and social visibility. Walking was encouraged by streets with defined edges, a clear structure, and activity, whereas the opposites were avoided.

In post-socialist cities, these findings are especially relevant. Public space is frequently a collection of what remains unbuilt in the urban space. Thus, it is often poorly defined in environments created by rapid urban development, informal construction, and land privatization. Even though many neighborhoods remain small and theoretically walkable, the loss of cohesive spatial structure undermines public space trust and affects walking behaviors. This helps explain why, even in areas with pedestrian infrastructure, short trips are replaced by other modes of mobility.

The study emphasizes how mobility behavior and urban morphology are shaped by perceived safety. Safety concerns in post-socialist settings are rarely motivated by criminal activity alone. Rather, they result from a lack of social cues that indicate collective ownership of space, poor visual control, and spatial uncertainty. Vulnerable users are unequally affected by these conditions, which also limit the inclusivity of public spaces and create unequal access to active mobility.

The findings suggest that sustainable mobility strategies in post-socialist cities cannot be based only on transportation infrastructure or technical interventions. Walking behaviors can be supported by

higher levels of safety through space legibility, continuity, and enclosure. The study contributes to mobility research by redefining perceived safety as a requirement of daily movement rather than a secondary or subjective concern. Achieving human-centered and socially sustainable mobility transitions in cities that have undergone rapid and uneven transformation requires addressing how space feels and functions in day-to-day life.

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International conference on sustainable mobility

Agenda

Project title: International Engineering Competence Centres to push Sustainable
 Mobility Development in Albania and Montenegro
Acronym: INTEC

Work package	
WP11	International conference
TASK	
11.4	Community Building Events

Dates	05.03.-06.03.2026
City	Tirana
Meeting venue	POLIS University Entrance Hall
Address	Rr. Bylis 12, Kodi Postar 1051, Kutia Postare 2995, Tirana, Albania

05.03.2026	
Entrance Hall, POLIS University	
8:30 - 9:00	Registration
9:00 - 9:30	Opening Performance
Welcome session - Auditorium A5 (Ground floor)	
9:30 - 10:00	Opening Remarks Dr. Elona Karafili (Vice Rector, POLIS University) Dr. Flora Krasniqi (Head of Office of Projects and Internationalization, POLIS University) DI Daniela Wenzl (INTEC Project Coordinator)
Auditorium A5 (Ground floor)	
10:00 - 11:00	Keynote speakers DI Horst Pflügl AVL Collaborative Research for sustainable Mobility DPSHTRR Representative - (General Directorate of Road Transport Services in Albania)
11:15 - 11:30	Coffee break (Moving into parallel sessions)

11:30	SESSION 1: POLITICAL AND REGULATORY FRAMEWORK AULA B1	SESSION 2: TECHNOLOGICAL INNOVATION AULA B4
11:30 - 11:45	Opening Session: Prof. Emeritus dr Nataša Gospić (FSKL)	Opening Session: Associate Prof. Ivan Tolj (US)
11:45 - 12:00	Integrating Event Data Recorder (EDR) Technology into Sustainable Road Safety Frameworks within the European Green Deal Eriselda Alimeti, Parid Milo, Mentor Çejku, Anis Sulejmani, Odhisea Koça	Empirical Comparative Study of Structural CFRP Sandwich Structure Inserts for Out-of-Plane loads Imre Kovács
12:00 - 12:15	Infrastructure Readiness for Sustainable Mobility: EU Frameworks and the Case of Albania Ervin Kalemaj, Parid Milo, Mentor Çejku, Anis Sulejmani, Odhisea Koça	The Role of Intermodal Transportation for the Sustainable Mobility Márton Kovács
12:15 - 12:30	Review of the Evolution of International Ship Energy Efficiency Regulations and the Albanian context Dr. Blenard Xhaferaj, Doklejda Hodaj	Impact of Heat Pump Systems on Winter Energy Use and Driving Range in Battery Electric Vehicles Luis Henrique Pereira Martins
12:30 - 12:45	Renewable Energy Procurement (CPPA) and Transport Electrification: European Perspectives and Albanian Challenge Antonio Ndoci, Anis Sulejmani, Odhisea Koça, Mentor Çejku, Parid Milo	Liquid Cooling Systems for Electric Vehicle Batteries: Improving Safety, Performance and Sustainability João Miguel de Almeida Ribeiro Silva
12:45 - 13:00	The Current Status of Autonomous Vehicle	Analysis of Battery Charging and Discharging Behavior for Electric Vehicle Applications Leona Markic, Luka Filipović

	Technology Adoption in the Balkan Region Darjana Lopičić, Oliver Popović, Miloš Ilić, Bojan Kocić	
13:00 - 14:00	Lunch	
14:00 - 14:15	Reviewing the European Green Deal in Energy, Mobility and Industry Veselinka Calasan, Ivana Ognjanović	Automotive Cooling Systems Sustainability: A Focus on the Expansion Tank Ana Inês Barbeiro Casimiro
14:15 - 14:30	The European Green Deal and its National Implementation: From Strategy to Practice Blerina Bektashi, Andi Bektashi	Design and Development of a Constant-Volume Combustion Chamber for Optical Investigation of Hydrogen and Water Injection Under Engine-like Conditions Julius Hollerith, Prof. Dr. Bhavin Kapadia
14:30 - 14:45	From Prediction to Regulation: Evidence Production Approaches in Autonomous Mobility Research and Their Policy Implications Sadmira Malaj	Emission Reduction of Marine Propulsion Systems in SECA Zones Through the Integration of Hydrogen Technologies Motaleb Miri, Ivan Radaš, Marija Mandić, Ivan Tolj
14:45 - 15:00	Questions and Discussion	A Comprehensive Analysis of Ventilation System for Enhanced Energy Efficiency in Marine Propulsion Applications Sara Blašković, Gojmir Radica, Jakov Šimunović

15:00 - 15:15		<p>Design and Topology Optimization of a Lightweight Chain Sprocket for Electric Motorcycle Applications</p> <p>Teo Čolović, Ivo Marinić-Kragić</p>
15:15 - 15:30	<p>SESSION 3: ECONOMIC AND BUSINESS PRESPECTIVES + CASE STUDIES AND GOOD PRACTICES</p> <p>Aula B1</p> <p>Opening Session: Dr. Anis Sulejmani (PUT)</p>	<p>Questions and Discussion</p>
15:30 - 15:45	<p>Managing Renewable Energy Resources as a Foundation for Sustainable Mobility Transitions</p> <p>Deivi Sinanaliaj, Martin Bektashi</p>	
15:45 - 16:00	<p>Feasibility of Electric Bus deployment in Montenegro: A Case Study of Budva (Erasmus+ INTEC / IECC Context)</p> <p>Anastasija Mrkajic, Vinko Nikic.</p>	
16:00 -16:15	<p>Children Paths as an Urban Regeneration Strategy: Naim Frasheri Study Case</p> <p>Dejvi Dauti</p>	
16:15 - 16:45	<p>Questions and Discussion</p>	

International conference on sustainable mobility

Agenda

Project title: International Engineering Competence Centres to push Sustainable Mobility Development in Albania and Montenegro
Acronym: INTEC

Work package	
WP11	International conference
TASK	
11.4	Community Building Events

Dates	05.03.-06.03.2026
City	Tirana
Meeting venue	POLIS University Entrance Hall
Address	Rr. Bylis 12, Kodi Postar 1051, Kutia Postare 2995, Tirana, Albania

06.03.2026		
First Floor Hall, POLIS University		
8:30 – 9:00	Registration	
9:00– 9:15	SESSION 4: SOCIAL AND ENVIRONMENTAL IMPACT AULA B1	SESSION 5: FUTURE SCENARIOS AULA B4
9:00 – 9:15	Opening Session: Prof. Dr. Bhavin Kapadia (FHF)	Opening Session: MA Adrian Millward-Sadler (FHJ)
9:15 – 9:30	Comparison of Lifecycle Emissions of a SUV with Fuel Cell and Battery Electric Powertrains - Bhavin Kapadia, Alper Sayin, Sandra Eisenträger	GENAI Literacy as a Transversal Skill for Emerging Professionals: Implications for Sustainability- Critical Knowledge Work - Adrian Millward-Sadler
9:30 – 9:45	Smart Mobility Technologies and their Impact on Urban Sustainability: Insights from	Effects of Technical Traffic Calming Measures – Filip Perović

	European and Western Balkan Cities – Alma Gjonaj, Vjola Ziu	
9:45 – 10:00	The Disappearing Squares: Social and Environmental Impacts of Urban Mobility Planning in Durres – Arjola Sava	Cybersecurity Vulnerabilities in Electric Vehicle Operating Systems: A Global Awareness Analysis – Aleksa Radević
10:00 – 10:15	The City that Demands Continuous Movement: The Disappearance of the Right not to Move within the Framework of Sustainable Mobility – Avrili Meshi	Development of a risk assessment model for the transport of hazardous materials using ALOHA and GIS software tools – Marko Radetić
10:15 – 10:30	Between Rhetoric and Reality: Discursive Framings, Greenwashing and Outcomes in Sustainable Mobility – Kejsi Veselagu	Mapping Distance and Time Leveraging Isochrone Intelligence in Emerging Cities – Andia Vllamasi, Erjon Cobani
10:30 – 10:45	Reimagining the City Through Green Mobility Strategies: The Case of Tirana – Vjola Ziu, Alma Gjonaj	Can AI develop its Own “Taste” Automotive Design? – Gregor Andoni, Kristjana Meço
Coffee Break		
11:00 – 11:15	Linking Morphology, Perceived Safety, and Sustainable Mobility in Post-Socialist Urban Contexts– Sindi Doce	Optimizing Public Transport Corridors Using AI-Based Scenario Modelling: A case Study on Tirana’s Ring Road – Erjon Çobani, Julian Beqiri, Merita Guri
11:15 – 11:30	Towards Sustainable Transport: A Comparative Analysis of Electric Vehicle Adoption in Montenegro and Albania – Radmila Milić	Threat Landscape and Multi-Layered Protection Mechanisms for Autonomous and Electric Vehicle Systems – Marko Asanovic, Oliver Popović, Zoran Avramović, Nataša Gospić

11:30 - 11:45	Questions and Discussion	Cybersecurity Challenges in Modern Vehicular Communication Networks - Aleksandar Grgurević, Nataša Gospić, Oliver Popović
11:45 - 12:00		Green Transition in Albania: Challenges and Future Actions - Erik Kushta, Andi Hyka, Enea Nasto
12:00 - 12:15	SESSION 6: CONTROVERSIES AND CHALLENGES Aula B1	Use of AI in the Process of Green Transformation and Impact on Public Health - Esmeralda Hamiti, Federika Alliaj, Kristi Metushi
	Opening Session: Prof. Kristofor Lapa (UV)	
12:15-12:30	The Adoption of Electric Vehicles in Albania: A Comparative Study with Other Western Balkan Countries - Doklelda Hodaj, Andrea Lapa	Development of an Automatic Traffic Sign Detection System Using YOLOv8 - Valentina Vojinović, Luka Filipović
12:30-12:45	Application of Quality Tools in the Analysis of Factors Influencing the Development of Electromobility in Montenegro - Jelena Šaković Jovanović, Draško Jovanović, Mirjana Grdinić Rakonjac, Marko Lučić, Miloš Perović, Aleksandar Vujović, Gordana Radulović	The Historical Development of Artificial Intelligence and Its Influence on the job market in Automotive Engineering - David Josef Pilgram
12:45 - 13:45	Questions and Discussion	Questions and Discussion
13:45	Lunch	