

Aalto University

Title: Citizen diversity and representation in integrated land-use and transport policies

Abstract: This paper asks “who do we plan for?” as it analyses two consecutive municipal masterplan documents in Copenhagen, Helsinki, Oslo, and Stockholm and utilizes expert interviews conducted amongst local actors representative of different citizen groups and inclusive planning practices. The purpose is to record the different citizen groups the municipal masterplan documents entail regarding integrated transport and land-use planning. Thus, citizen diversity and (in)equity in transport and land-use planning becomes the center of attention in this research. Citizen diversity can often be disregarded by only simplifying mobility and the related distribution of space to concern, for example, “pedestrians” and “cyclists” and to the very vehicle-oriented “public transport” and “car traffic”. When this is done, the unjust allocation of space – for transport and activities, and moreover the people behind these transport modes or utilized space are lost in the process. The interviews offer insights into representation and means of inclusion, but also provide alternative approaches and visions to truly plan more sustainable and just urban areas for a more diverse set of citizens.

Presenter: Dr. Linda Karjalainen

Biography: Linda Karjalainen holds a PhD in interdisciplinary environmental sciences (University of Helsinki). Her research focuses on sustainable mobility and just use of space in urban areas, particularly highlighting alternative framings for planning and policymaking, as well as citizen diversity and representation. Karjalainen works as a postdoctoral researcher at Aalto University and as a researcher at the Finnish Environment Institute.

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Title: Managing the demand-responsive transport niche within the urban mobility ecosystem

Abstract: Despite decade-long efforts, real-time demand-responsive transport (DRT) services are still struggling to be a part of sustainable urban mobility systems. Studies have shown a high failure ratio of DRT services. Previous research efforts have pointed out several factors for the failure of DRT services such as service design, low demand, high costs and subsidy requirements. The research develops a framework to summarize the factors of success and failure with aim to help with identifying critical intervention points. In addition, study analyses how urban DRT services are understood in terms of service performance in ex-post evaluation. The developed framework identifies critical intervention points in urban mobility system, as well as factors and

conditions of urban DRT service. Research findings with empirical insights helps in understanding the state of knowledge and identifying the gaps in literature.

Presenter: Atiullah Saif

Biography: I am Ati, a researcher working on emerging urban mobility systems at Aalto University. Moreover, I am part of the EIT Urban Mobility community as a member of doctoral training network. My research interests focus on developing the understanding of emerging urban mobility services both in air and land mobility services. For my dissertation, I am analyzing the Demand Responsive Transport services to find answer to some of the questions related to the implementation in urban environment.

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Title: LinTim: An open-source tool for integrated optimization in public transport planning

Abstract: Mathematical optimization is a powerful tool for planning public transport supplies. Models and algorithms have been developed for numerous planning stages such as network design, line planning, timetabling and vehicle scheduling. While each of these stages is well researched, they are often considered in isolation. The open source software toolbox LinTim allows for considering multiple stages in an integrated manner by bridging the gaps between algorithms for different planning stages. For example, the influence of different line plans on the resulting timetable can be analyzed in an automated manner. By connecting planning stages and providing unified testing data, LinTim is uniquely situated for developing and testing new algorithms for public transport planning.

Presenter: Philine Schiewe

Biography: In my research, I am addressing operations research problems arising in transportation and urban planning particularly regarding sustainability. To model, analyze and solve these problems, I develop and apply methods from combinatorial optimization and algorithm engineering. For example, having a good understanding of the complexity of special cases can be utilized to develop exact and heuristic solution approaches for more general settings. This also applies to the integrated optimization of sequential processes where a larger solution space leads to both better overall solutions and more intricate problems.

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Title: Multiple Recycling of Asphalt Pavement: A Finnish Case Study

Abstract: The Nordic regions, known for their cold climates and progressive environmental policies, have been at the forefront of sustainable infrastructure development. These areas have long recognized the value of recycling within the pavement life cycle, especially the reuse of reclaimed asphalt pavement (RAP). However, despite the commonality of recycling efforts, there is a long way to go toward the development of a structured methodology for multiple recycling. This study investigates the Finnish approach to multiple recycling of RAP, aiming to understand its impacts on asphalt performance and to develop a methodological framework for its application. The research focuses on a series of experiments designed to evaluate the effects of up to three generations of recycling on the properties of asphalt mixtures and binders. Firstly, loose asphalt mixtures are aged in the oven to generate one-time, two-times, and three-times aged RAP. Subsequently, a series of asphalt mixtures are prepared using 50% artificially aged RAP, 70/100 binder, and fibers, experiencing various recycling levels. The study examines parameters such as moisture susceptibility, rutting resistance, and abrasion from studded tires at the mixture level, alongside rheological and chemical properties at the binder level. Findings reveal that multiple recycling iterations enhance specific performance metrics, including moisture resistance and high-temperature behavior while posing challenges to fatigue life due to the stiffening of binders. This exploration into the Finnish case study illuminates the potential of multiple recycling in extending pavement life and enhancing its resilience against environmental stressors. It underscores the necessity of developing a systematic approach to recycling that considers the varied impacts on material performance. The study not only contributes to the global demand for sustainable infrastructure but also effectively demonstrates the viability of conducting multiple recycling of RAP in cold climates, especially in Nordic regions.

Presenter: Yuxuan Sun

Biography: Hello, I'm Yuxuan Sun, a dedicated and passionate researcher in Civil Engineering, with a focus on asphalt pavement technology and road design. In my current research, I am delving into multiple recycling of asphalt, a critical area in the context of sustainable urban planning and transportation systems. My academic journey includes a bachelor's degree in civil engineering and a master's degree in architecture and civil engineering, both from China. My professional experience also includes an assistant engineer role in providing pavement technical services and asphalt mix ratio design at Shandong Transportation Institute.

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Title: Rheology prediction of asphalt binders based on artificial intelligence

Abstract: This work aims to provide rapid rheological characterization of asphalt binders through their chemical properties based on advanced machine learning tools. With this objective, Fourier transform infrared spectroscopy (FTIR) and dynamic shear rheometer (DSR) are adopted to measure the chemical and rheological properties. Results indicate that binders have six similar typical bond areas, but different grades, sources, and batches can affect the area value. DSR test reveals that the rheological properties of binders are significantly affected by temperature and correlated with the chemical composition of binders. The raw six FTIR features can be reduced to two principal components (PC 1 and PC 2), and the variance and role of PC 1 are more significant than PC 2. Multiple linear regression models can predict the phase angle accurately but not for modulus. Gaussian process regression model with higher R2 and lower RMSE values can accurately predict both modulus and phase angle.

Presenter: Fan Zhang

Biography: Hello, here is Fan Zhang, a doctoral researcher in Civil Engineering at Aalto University. Mr. Fan Zhang graduated from the School of Highway at Chang'an University where he obtained his MSc degree in 2022. His research interests include green self-healing technology of asphalt pavement, polymer physics and chemistry. He has an internationally recognized track record of publications in sustainable asphalt materials and engineering. He also serves as a reviewer for international journals and conferences. Mr. Zhang is a member of several international academic associations, e.g., RILEM, ASCE, COTA, IACIP.

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**Title: Explaining the transition to the sustainable mobility paradigm through policy calibrations:
The case of transport policies in Espoo**

Abstract: Given the increasing prominence of sustainability issues on a global scale, many cities have adopted sustainable mobility as part of the development strategy to reduce negative impacts from the transport sector. Many studies are dedicated to identifying policy instruments that can enable a transition from current transport planning approach to sustainable transport planning. However not much is understood about the role of micro-level changes in the operational settings of policy instruments in this transition process. To contribute to this research gap, this study examines patterns of transport policies development in the city of Espoo, Finland from 2013-2023 and highlights how policy change are more concentrated in the calibration of instruments. The year 2013 marks Espoo's starting point of sustainable development work and these ten years have seen positive developments in the city's transport policies to reduce traffic emissions. This period also shows an interesting change in the way the city views the role of cars in its transport network despite its emphasis on sustainable development goals.

Preliminary results from a document analysis of Espoo's transport policies offer insightful findings on the calibration of policy instruments that correspond to the city's visions of transport future. The study also aims to illustrate how this pattern of policy change can hinder a more radical transformation in the city's transport policies.

Presenter: Thu Pham

Biography: Thu is a doctoral researcher in Spatial Planning and Transport Policy at Aalto University. Her research interests include policy design and governance, transport policy and sustainable mobility transition. As part of her doctoral studies, Thu is doing research on policy design for the decarbonization of transportation in Finland and focuses on city-level policy measures. Prior to joining Aalto, Thu worked as senior policy analyst at Vriens & Partners Vietnam Office and led research on policy and regulatory issues in the environment, food & beverage, renewable energy, and education sectors. Thu also previously worked in international cooperation at the Vietnam Ministry of Science and Technology.

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