MAKING CITIES FOR AUTONOMOUS SHARED MOBILITY

24 June 2021
9.30 - 13.30 (France) | 16.30 - 20.30 (Japan)
Online | In English

These days, we see changes coming from traditionally human-driven vehicles to the automation vehicles (AVs) and smart cities concepts. The emerging technologies offer improvement of transportation quality, mitigate traffic congestion, reduce pollution, and bring economic benefit. This workshop highlights the automation shared mobility through the implication to ensure that the AVs technologies can be deployed in ways that maximize the public benefit. Whether AVs offer practical benefits depends on certain city conditions that allow new mobility to be flourishing.

AVs have generated both excitements as well as anxieties about the future of urban transportation and lifestyle. The transition time to automation mobility offers opportunities for cities to reconsider and prepare. How to adapt automation shared mobility to existence city context? How to integrate the concept of automation shared mobility to emerging technologies including MaaS (Mobility as a Service) and IoT (Internet of Things)? Which roads will be ready for automation shared mobility? Who will be responsible for building advanced infrastructures?

The discussion panel covers two key sessions on infrastructure development and governance. First, we will discuss specific support infrastructures for new mobility systems. Second, the governance session will discuss on networking and collaboration requirements among stake holders to build and regulate frameworks. The discussion will exchange diversity of experimental cities and their dynamics from hands-on experiences and research findings by actors of governance in policy implementation, industry development, and academic research.

Programme

09.30 | Opening Remarks

Sébastien Lechevalier (EHESS-FFJ), **Jean-Luc di Paola-Galloni** (Valeo), **Kulacha Sirikhan** (EHESS-FFJ)

Session 1: Transport Infrastructure Requirement

09.45 | Introduction

09.50 | Potentials and Challenges of the Connected Autonomous Shared Electric Vehicle (CASE) in Southeast Asia Mega-Urban Regions

Kulacha Sirikhan (EHESS-FFJ)

10.05 | Urban sprawl or reurbanization? An agent-based simulation of Autonomous Vehicles and Household Relocation

Rolf Moeckel (Technical University of Munich)

10.20 | Exploring the System Impact of Automated Taxis Via Simulation

Sebastian Hörl (IRT System X)

10.35 | Discussion

11.05 | Break

Session 2: Institutional Capacity of Governance and Regulations Requirement

11.40 | Introduction

11.45 | Connected and Autonomous Vehicles: Priorities for Policy and Planning

Alexandros Nikitas (University of Huddersfield)

12.00 | Mechanisms and Impacts of Dynamic Pricing in Ride-Hailing Services: Case Studies in Bangkok and Hanoi

Hironori Kato (The University of Tokyo)**, Masanobu Higashino** (The University of Tokyo, and Ecole des PontsParisTech)

12.15 | Planning for New Mobility Concepts Under Deep Uncertainty

Peraphan Jittrapirom (Radboud University)

12.30 | Niche Market Development of a Shared-Electrified Mobility Service: Case of a Start-up Providing Corporate Employee Transport Service in Bangalore, India

Haruki Sawamura (EHESS-FFJ, and Ecole Polytechnique)

12.45 | Discussion

13.15 | Concluding Remarks

Speakers

Sébastien Lechevalier (President of FFJ, Professor at EHESS)

Sébastien Lechevalier is an Economist and a Professor at EHESS (School of Advanced Studies in the Social Sciences, Paris), specialised in Japanese economy and Asian Capitalisms. He is also founder and president of the Fondation France-Japon de l'EHESS (FFJ). He has been a Visiting Professor At Tokyo University, Kyoto University, Hitotsubashi University, Waseda University and Doshisha University.

Jean-Luc di Paola-Galloni (Valeo Group Corporate Vice-President)

Jean-Luc di Paola-Galloni became group corporate VP in charge of sustainable development and external affairs at Valeo in 2010. He was previously advisor to the CEO of Gaz de France and has research experience in the field of defense, international relations and strategic affairs since he has been a scholar of Harvard University, École Normale Supérieure and Institut des Hautes Études de Défense Nationale. In 2018, he was elected president of Artemis-IA, the European association representing the embedded systems industry and research actors in the Ecsel Joint Undertaking. Jean Luc's commitment to establish fair relationships between the automotive industry and international bodies, with a multi-stakeholder approach, is also reflected by his engagement as a member of the Corporate Partnership Board (CPB) of the International Transport Forum (ITF), the formal mechanism of the OECD and associated countries' transport ministers to engage with the private sector.

Kulacha Sirikhan (2020 FFJ/Valeo Research Fellow)

Kulacha Sirikhan is a 2020 FFJ/Valeo Fellow at EHESS in Paris, France. Sirikhan has a Ph.D. degree and master's degree in urban and regional planning from The University of Tokyo, Japan with granted by The Asian Development Bank and the Graduate Program for Social ICT Global Creative Leader for the master and doctoral studies, respectively. Her main research fields are urban studies and spatial governance, focusing on the dependency between institutional and spatial formation. She is particularly interested in the geography of innovation, knowledge spillovers, and agglomeration economies in building regional innovation capacities, promoting creative and innovative development, and stimulating the city's competitiveness.

Title: Potentials and Challenges of The Connected Autonomous Shared Electric Vehicle (CASE) from Urban Geography Perspective in Southeast Asia Mega-Urban Regions

The discussion on automation vehicles (AVs) deployment has been framed by dichotomies between optimistic and pessimistic scenarios. The AVs can increase transportation capacities and accessibilities. In contrast, AVs can stimulate car dependency and increase greater urban sprawl because individuals may accept to commute farther distances due to the comfort of trips. To avoid a pessimistic scenario, the concept of connected autonomous shared electric vehicle (CASE) has introduced as a shared AVs deployment model that connected AVs feature can be interweaved and compatible with various mobility modes. Whether CASE offers practical benefits depends on certain city conditions that allow new mobility to be flourishing. Particularly, the capital cities in Southeast Asia (SEA) are well recognized for their world ranking traffic congestion problems and different driving behaviors compared to cities with more advanced requirements for AVs.

The transition time offers opportunities for cities to reconsider and prepare. One key question for the future is how to adapt CASE to cities with underdeveloped infrastructure. The exploratory scenarios method is used to illustrate plausible futures through mega-urban region cases of Bangkok and Ho Chi Minh. The cross-impact analysis generates the quadrants scenario matrix based on the scanning of major trends and critical uncertainties.

The major trends axis covers individual versus integration of AVs deployment models. The axis of critical uncertainties covers the governance approach of intervention and non-intervention (Laissez-faire) approach. Potentials and challenges in CASE implementation in each quadrant's scenarios are differ depending on a certain mobility system. This research considers the range of plausible scenarios on urban geography factors; network capacity, accessibility, and land use, which aims to identify a pathway to the desirable outcome in a certain context of Bangkok and Ho Chi Minh.

Rolf Moeckel (Assistant Professor, Technical University of Munich)

Rolf Moeckel is an Assistant Professor in the Department of Civil, Geo and Environmental Engineering at the Technical University of Munich in Germany. He leads a research group called Modeling Spatial Mobility that focuses on travel behavior research and transport modeling. He conducted research as a PostDoc at the National Center for Smart Growth at the University of Maryland and worked as a consultant with Parsons Brinckerhoff in New York, NY and Albuquerque, NM. He holds a doctorate in spatial planning from the University of Dortmund in Germany.

Title: Urban Sprawl or Reurbanization? An Agent-based Simulation of Autonomous Vehicles and Household Relocation

Autonomous vehicles (AVs) are expected to make travel more comfortable and less burdensome. Two opposite effects are likely to occur: First, the reduced need to find parking for shared AVs could encourage some people to move into urban areas. The fact that one does not have to pay for parking anymore (because the AV can park itself elsewhere) makes central locations where parking is limited more attractive to live. Therefore, it is perceivable that AVs foster reurbanization.

On the other hand, AVs may entice people to move farther away from their work location and other travel destinations. This will enable people to live in larger or less expensive homes, to live in a greener environment or to live within a desired school district. Given that the AV allows the traveler to work or watch a movie, commuting time will be perceived to be less burdensome. Therefore, AVs may increase urban sprawl.

The agent-based integrated land use/transport model SILO-MITO-MATSim was used to simulate the impact of AVs on urban form. It was found that the average commute distance would double, and the vehicle-kilometers traveled would increase by one third. The impact of AVs on the distribution of population, however, is marginal. While some households move out of central cities to enjoy larger homes, others move into the city and enjoy the removal of parking issues.

Sebastian Hörl (Researcher, IRT SystemX)

Sebastian Hörl is a researcher at IRT SystemX in Paris where he is involved in various projects on agent-based transport simulation for passenger transport and logistics. He received his MSc in Complex Adaptive Systems at Chalmers University of Technology in Gothenburg and his PhD in Transport Planning at ETH Zurich. His main interests revolve around the topics of replicable use of open data and software in transport planning and applied large-scale transport simulation.

Title: Exploring the System Impact of Automated Taxis Via Simulation

Automated Mobility on Demand (AMoD) is a concept that has recently generated much discussion. On one hand, such systems promise increased accessibility and reduced costs, on the other hand there is the fear of rebound effects, increases in vehicle use, and disaggregation of public transport. The talk will cover a comprehensive simulation study on introducing an AMoD service in the existing transport system of Zurich. Details will be given on a detailed cost analysis for automated mobility in the Swiss context, a region-wide stated preference survey to assess the potential travel behavior of the population, and a large-scale agent-based transport model. The talk presents equilibrium points in which system costs, waiting times and user choices are consistent with each other.

Haruki Sawamura (FFJ Research Fellow and Ph.D. Student, Ecole Polytechnique)

Haruki Sawamura is a PhD candidate at the Management Research Centre of Ecole polytechnique (i-3 CRG, Ecole polytechnique CNRS, Institut Polytechnique de Paris). A Valeo research fellow (2019-2020) at Fondation France-Japon (FFJ) de l'Ecole des Hautes Etudes en Sciences Sociales. His doctoral research focuses on how technology-oriented products diffuse in the society through business activities. Taking a start-up company providing new mobility services in Indian cities as a case study, his doctoral research aims at revealing how the level of development of relevant innovation ecosystems influences the evolution of the business model of the focal company. Within the focus of business model innovation and organizational change management, his recent research as a Valeo fellow addresses the question of the partition of roles between human and automation technologies (such as autonomous vehicles using artificial intelligence for operation). While advanced-automated products are expected to diffuse in the society and more wider range of people in the society (regardless their job, age or aspiration) are to be exposed to automated products, his latest research interest lies on the social implementation of new technology-oriented products through business model innovation taking human factor into consideration. He has the background of engineering: bachelor of Applied Physics at Waseda University and master of engineering at the department of Technology Management for Innovation of the University of Tokyo.

Title: Niche Market Development of a Shared-Electrified Mobility Service: Case of a Start-up Providing Corporate Employee Transport Service in Bangalore, India

The diffusion of a new type of mobility (CASE, for example) can be led by private actors. The study focuses on a start-up company that provides a shared-electrified mobility service in Bangalore since 2015. Bangalore is the fifth largest Indian city where the development of information and communication technology industry contributes to its steady economic growth.

The company is the first company that uses electric vehicles as fleets to provide Corporate Employee Transport (CET) service in India. The company developed a business model to address a local niche demand. While the demand for new mobility service emerges along with the economic growth and population growth of urban India, companies face variant challenges in exploiting this market potential. The research is based on a longitudinal empirical data obtained through four field surveys carried out from 2016 to 2018. The presentation illustrates the challenges that the focal company faces including those on road and electricity infrastructures that are under development and on the activities of actors in relevant innovation ecosystems.

Alexandros Nikitas (Reader, Deputy Director of the School's Behavioural Research Centre, University of Huddersfield)

Dr Alexandros Nikitas is a Reader in Smart Transport for Huddersfield Business School, University of Huddersfield, UK. He is the Deputy Director of the School's Behavioural Research Centre and co-investigator of the University's European Structural and Investment Funds project LCR LEP Supply Chain. He is an Associate Editor of the *Journal of Transport & Health* and member of the Editorial Boards of the Journals *Research in Transportation Business & Management and Case Studies on Transport Policy*. His research on the societal importance of sustainable mobility and autonomous, connected, shared and digitised transport has been published in more than 80 journal and conference papers. Earlier in his career Dr Nikitas was a Senior Researcher in Urban Futures and Transportation for Chalmers University of Technology, Sweden. He has also been an invited visiting scholar for Tongji University and Chang'an University in China and EC's Joint Research Centre, Ispra, Italy. Between 2011 and 2014 he served as a Local Councillor for his hometown Drama, Greece.

Title: Connected and Autonomous Vehicles: Priorities for Policy and Planning

Connected and Autonomous Vehicles (CAVs) is a paradigm-shifting mobility technology that will redefine the urban landscapes of the future by employing the immense capabilities of Artificial Intelligence, Machine Learning and wireless connectivity. Despite great technological progress orchestrated by the automotive industry and millions of autopiloted road miles travelled in segregated environments and living lab conditions

the road to a full-scale implementation is significantly longer and harder that many might anticipate. This is because CAVs is not a simple techno-fix but rather a complex piece of a diverse socio-technical transition to an unprecedented smart mobility paradigm that still needs to prioritise people over machines. Policy and planning need to be seriously reviewed, redesigned and rebranded to fit their specific needs before CAVs can become a powerful game-changer for transport service provision. This paper provides a roadmap of the opportunities and challenges that reflect and affect the policy and planning of CAVs highlighting 10 priority areas namely: technology, legislation, crisis and employment ethics, infrastructure and land use, integration, traffic safety, cybersecurity and privacy, business models, traffic congestion and travel behaviour and finally acceptability, trust and customer readiness.
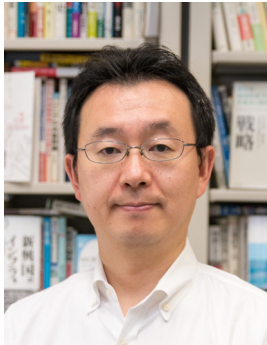
Hironori Kato (Professor, The University of Tokyo)

Hironori Kato is a full professor at the Department of Civil Engineering, Graduate School of Engineering, The University of Tokyo since November 2013. He graduated from the Department of Civil Engineering, the University of Tokyo in 1993 and obtained his doctoral degree in 1999 from The University of Tokyo. He has been studying transportation planning and policy since 1995, first as Research Associate at The University of Tokyo, then as Project Manager at the Institute of Transport Policy Studies in Tokyo, and for the last 20 years up at The University of Tokyo. He is also currently serving a co-director of the Program for Master in Infrastructure Engineering, Vietnam Japan University (VJU) at Hanoi since September 2016.

Masanobu Higashino (Master Student, The University of Tokyo and Ecole des PontsParisTech)

Masanobu Higashino is a master's student at the Department of Civil Engineering, Graduate School of Engineering, The University of Tokyo. He graduated from the Department of Civil Engineering, the University of Tokyo in 2021. He has been studying ride-hailing services under the supervision of Prof. Hironori Kato since 2020. He is also a double-degree student at Ecole des PontsParisTech.

Title: Mechanisms and Impacts of Dynamic Pricing in Ride-Hailing Services: Case Studies in Bangkok and Hanoi

Ride-Hailing Services (RHS) are bringing dramatic changes to transportation with the characteristic of dynamic pricing in developing countries as well as in developed countries. We conducted case studies in Bangkok and Hanoi to investigate the mechanism and the impact of dynamic pricing. Time-series analyses were employed to find the mechanism. It suggested that the state of supply and demand have influenced later price increases, and that price increases have influenced the increase of supply. In addition, large-scale questionnaire surveys on RHS were conducted for residents in Bangkok and Hanoi, and we estimated the factors behind the price increase from the responses of the latest RHS trip.

Peraphan Jittrapirom (Senior Research Fellow, Radboud University)

Peraphan Jittrapirom is a senior research fellow at Radboud University, the Netherlands, and supports the Global Carbon Project as one of its executive directors (National Institute for Environmental Studies, Japan). His research focuses on transport planning and policymaking to support implementations of smart mobility concepts and the transition toward a sustainable transport system.

Title: Planning for new mobility concepts under Deep Uncertainty

New mobility solutions, such as Mobility as a Service (MaaS) and carsharing, have prospects to solve urban mobility challenges. However, planning for their implementations is challenging as the concepts are surrounded by uncertainties, such as their fuzzy definitions, operation complexity, and diverse users' and stakeholders' expectations. Given these unknowns, is it still possible to plan for their implementations, and what planning approach could be suitable? In this presentation, we purport a possible planning framework and methods to support implementations of these concepts based on the results of our research projects in the Netherlands and Thailand.