DAVeMoS Newsletter

University of Natural Resources and Life Sciences
Department of Landscape, Spatial and Infrastructure Sciences
Institute for Transport Studies – DAVeMoS research group

Newsletter Vol. 01/2020

1. Introduction of DAVeMoS
2. Mastering mobility transition in the digital age
3. Assessing and controlling the impacts of automated mobility in the interests of sustainability
4. Remarks by BOKU Rectorate
5. New data in transport: It is more than apps and GPS-based tracks
6. Digibus results and reflections
7. Editorial on Covid-19 and transport
8. List of DAVeMoS activities
9. List of DAVeMoS publications

DAVeMoS is an Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (*Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie*, BMK)'s Endowed Research Group with a mission to strengthen the competitiveness and knowledge building in the field of digitalisation and automation in the transport and mobility system at local, regional, national, and EU levels.

Read more about DAVeMoS at:
www.davemos.online

Head of the group:
Univ. Prof. Dr. Yusak Susilo
yusak.susilo@boku.ac.at

Hosted by BOKU Institute for Transport Studies:
www.boku.ac.at/en/rali/verkehr

1. Introduction of DAVeMoS

This professorship and research group was started in October 2019 and is positioned at the University of Natural Resources and Life Sciences (BOKU). It is co-funded by the Federal States of Lower Austria and Salzburg, the City of Vienna, Wiener Linien, and the Economic Forum Waldviertel with the intent to support a sustainable development of these new technologies and services in their respective regions.

Professor Dr. Yusak Susilo is appointed as the BMK Endowed Professor in Digitalisation and Automation in Transport and Mobility Systems. Prior to joining BOKU, he was Full Professor in Transport Analysis and Policy at the KTH Royal Institute of Technology, Stockholm, Sweden. During his tenure in Sweden, Prof. Susilo lead various flagship projects: (1) together with relevant stakeholders, he evaluated the impacts of free public transport in the City of Tallinn, Estonia, (2) …

(to be continued)

2. Mastering mobility transition in the digital age

Facing digitalisation means entering an uncharted territory. Complex interwoven technological and social developments provide chances and challenges for the transformation of our mobility system at the same time. This calls for a systemic approach to bring forward innovative solutions in a responsible way and for profound scientific competences to build the necessary evidence base for policy and decision making.

Utilizing an utmost of potential from digitalisation and automation for a sustainable, inclusive and decarbonized mobility system 2040 and beyond means thinking beyond system boundaries of institutions and sectors.

Deep understanding of interrelations and side-effects across domains (e.g. spatial planning, environment, health), …

(to be continued)

Bundesministerium Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie
FFG Forschung wirkt.
Stadt Wien
LAND NIEDERÖSTERREICH
LAND SALZBURG
WIENER LINIEN
Wirtschaftsforum Waldviertel

1. Introduction of DAVeMoS

(continued)

… (2) he designed and co-developed standardized door-to-door travel satisfaction measurement tools, for areas with different level of technology penetration, and has been trialled in eight European cities, (3) he developed an open source mobile-based travel diary collector, MEILI, which has been deployed in five different cities in three different continents, and (4) he lead the evaluation of the operation of the world's first automated public transport bus that operated on a public roads with mixed traffic in Stockholm, Sweden.

Based on these experiences, DAVeMoS aims to play an active role in promoting and implementing mobility solutions and technologies. It will focus on providing human-centred, holistic, inter- and transdisciplinary analyses of the possible impacts of automation and digitalisation on transport and mobility.
In particular, examining the system level impacts of digitalisation and automation based solutions to change individual travel behaviours and to provide seamless, safer, more sustainable, environmental friendly, and inclusive transport and mobility solutions will be the focus of DAVeMoS activities.

Univ. Prof. Dr. Yusak Susilo, ST., MT., D.Eng., PGCert. TLHE, Docent.
BMK Endowed Professor in Digitalisation and Automation of Transport and Mobility System

2. Mastering mobility transition in the digital age

(continued)

… taking precautions for the avoidance and mitigation of adverse effects (such as rebounds) and reconciling between interests is key to ensure benefits both for society, industry and the environment. Research, technology and innovation (RTI) has to contribute in providing suitable competences, methodological foundations and tools to create a common and desirable picture of mobility future in the digital age.

Our RTI funding program Mobility of the future (www.mobilitaetderzukunft.at) supports new systemic and technological solutions with a broad portfolio of interventions. Our endowed professorship DAVEMOS complements this set of activities by boosting the necessary scientific knowledge base to address digitalisation and automation in mobility comprehensively. DAVEMOS is intended to act as a knowledge, support and coordination hub between related actors and stakeholders. It will complement and support other RTI activities and Austria's policy making in a synergetic way, fosters necessary exchange and collaboration processes and will position Austrian RTI actors and solutions in international arenas.

DI Walter Wasner
Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), Unit for Transport and Mobility Technologies

3. Assessing and controlling the impact of automated mobility in the interests of sustainability

Automated mobility holds great potentials: increased traffic safety, increased traffic efficiency and therewith a contribution to CO2 reductions well as tremendous possibilities to change our mobility behavior. First and foremost, it is about livable public spaces and ensuring a sustainable and climate-friendly mobility system.
Testing and introduction of automated mobility in tests, pilot projects and in downstream regular operations influence a variety of factors. Analysis and survey of potential impacts associated with different introduction scenarios should enable planning perspectives, indicate risks and highlight opportunities. In this regard, it is important to point out when certain effects are anticipated and which framework conditions need to be defined in order to enable the desired impact and to prevent adverse effects.
Hence, a strategic and coordinated approach is mandatory to achieve these societal objectives. The BMK supports the buildup of an endowed chair to expand the scientific expertise in the fields of digitalisation and automation and to fulfill this approach.

Ing. Michael Nikowitz, MSc
Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), Unit for Transport and Mobility Technologies
Coordinator for Automated Mobility

Bundesministerium Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie
FFG Forschung wirkt.
Stadt Wien
LAND NIEDERÖSTERREICH
LAND SALZBURG
WIENER LINIEN
Wirtschaftsforum Waldviertel

4. Remarks from from the Rector of BOKU

Automation and digitalisation in transport and mobility system is crucial not only for our sustainable future, but also in diversifying our economics and in creating an inclusive, safe, efficient, and seamless transport system for everyone. It will helps to provide more sustainable transport alternatives; it will helps to promote behavioural change towards more sustainable behaviours; it will helps to promote and/or facilitate the valuation of innovative mobility solutions; it will helps to quantify the system level impacts, to create new economic opportunities, and to seek the use of such technology in facing the coming digital and aging society. This endowed professorship, and its DAVeMoS research group, at the Institute for Transport Studies, is in-line with BOKU's strategic vision on sustainability whilst it is also actively playing role in exposing and facilitating younger Austrian generation, irrespective of their study programme, to be knowledgeable in facing the coming of automation and digitalisation age.

Univ.Prof. Hubert Hasenauer,
Dipl.-Ing. Dr.nat.techn. DDr.h.c.
Rector of the University of the Natural Resources and Life Science

5. New data in transport: It is more than apps and GPS-based tracks

In the last decade, much attentions have been dedicated to explore the potential of 'big data' in transport planning and policy. There has been a big hype both in research and practice about the potential of this new data. ~~H~~However, this new type of data collection and analysis has been around and trialled since 1980s. Many researchers and industries have also collected such data for a while, both actively and passively.

When we talk about 'big data', it is more than just a tracking app and GPS tracks. There are many other types of "big data", collected by different sensors embedded in various appliances and items that we use every day. They are in our cars, buses and trucks. They are also collected by our gadgets such as smart/fitness-watch on our wrists and even by our TV and printer at our home. These sensors collect various information, such as our usage behaviours and favourite contents, temperature, humidity, and air pressure, motion and acceleration, sounds and images, etc., with location and time stamps, which then can be combined and analysed to virtually construct a set of realities in a given time and space.

To create such a data collector, via app, for example, the effort for designing and deploying the app may just only be 20-30% of the work. Setting up the back-end support, communication, processing, and maintenance (including security) systems behind the collection system is actually the area where knowledge and experience are lacking and where most investment will be required.

Talking about advancing our analytical methods, many people also do not realise that these types of data also require~~d~~ a new way of thinking in analysis and forecasting. It does not automatically come out as a typical individual's row based data, like traditional household survey data, since the nature of the collected data is multi-dimensional. This would be a challenge but also an opportunity to re-think the way we model our travel demand. For example, given that we will have an open stream of data from different sources for twenty-four hours per day, and given that now we live in a fast changing and less predictable society and environment, will we still have luxury of time and resources to produce a periodical large scale forecasting model? Or shall we focus on smaller, more flexible, less accurate, but more reactive models?

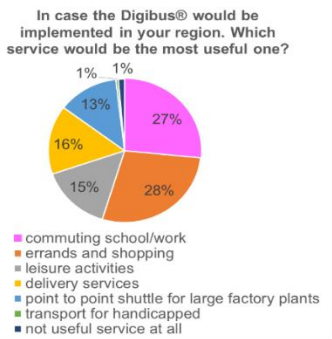
Perhaps, rather than trying to muscle our current model paradigm towards our policy objective, we should start from the objectives of our modelling exercise. For example, if we want to create a human-centred city, why not gain a deeper understanding of human behaviour and really carry out a multidisciplinary analysis that is operational to achieve our objective? Not only from economic and utility maximisation theory perspectives, but also from behavioural, psychology, health, and human geography sciences. Who knows - this would enable us to serve our customers (i.e. transport users) better.

Yusak Susilo

6. Digibus results and reflections

In summer 2019, the Digibus® project (funded by the Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology), where the Universität Bodenkultur is a project partner, operated a demonstration of an automated small bus in the Lower Austrian city of Wiener Neustadt accompanying the state exhibition (Landesausstellung), that took place at the same time in the city. The demonstration operated for 4 hours per day, two each before and after midday. It linked the main square of the city with St. Peter an der Sperr, one of the exhibition places and was sponsored by Mobilitätsland Niederösterreich and VOR. Interested persons could take a free ride either as a whole round trip or as shuttle to the exhibition centre. The shuttle operated on demand within the operation time daily except Sundays. All test users were asked to fill in a survey after the test ride to report their impressions. For many passengers, the demonstration in Wiener Neustadt was a first contact with an automated shuttle and the impression was consistently positive. A goal of the demonstration in Wiener Neustadt was thus clearly achieved. The passengers were very positive about the technology and put a lot of trust in the technology. There is little concern, for example, to let children use the vehicle on their own. The willingness to use such vehicles in the future, if they would operate in the areas of the respondents usually do their daily activities, is very high. Every second person could even imagine a replacement of the private car (concerning the use cases, see figure on the right).

The demonstration encouraged a representative sample of the Austrian population regarding age, education and type of residence to take a test drive. There was an expected bias regarding persons interested in technology among the test users, an extrapolation to the total population with regard to the statements made is therefore limited. The operation in the pedestrian zone turned out to be good opportunity, because the low maximum speed of the vehicle was not obvious, since only walking speed is permitted here. The demonstration was therefore a realistic scenario for the passengers. The Digibus® project will continue in summer/autumn 2020 with another demonstration in Koppl, province of Salzburg. In this case, there will be a fixed timetable, and the shuttle will act as a feeder bus service to a conventional bus line heading to Salzburg as a realistic use case. Further readings and up to date information on the project can be found at https://www.digibus.at/en/.



Roman Klementschitz

7. Editorial on COVID-19 and Transport

When I moved to Austria at the end of last year and enjoyed my first Silvester in Vienna, I had not foreseen that the world would quickly fall into such an unprecedented state of emergency. While the whole situation is extremely unfortunate and it is irking to see how easily accessible transport and activity hubs contribute significantly to the spread of the virus across the globe at lightning speed, it is mesmerising to see how living, but quiet, mega cities are trying their best to function through all digitalised solutions that they can think of. This outbreak also highlights the vulnerability of the basic design our social and economic resilience, in particular for the disadvantaged, poorer, and rural communities, during such a disruptive event. With climate change, globalisation and increasing interconnected economic and movement activities, such disruptive events will become more frequent in the future. Thus, strong social and local economic capital in strong local communities and neighbourhoods to support one another without recourse to hypermobility will become more and more important in the future. The question is whether, after this unfortunate event, we will learn and change something substantial in the way we design our city and economy after this unfortunate event pass, or whether we will do business as usual.

Yusak Susilo

8. List of DAVeMoS activities (10/19-03/20)

In Management:

1. On 9 December 2019 the DAVeMoS team had an introduction meeting with its funders. The meeting was opened by Mr. DI (FH) Andreas Blust from the BMK, Directorate III, Unit I4 Mobility and Transport technologies)
2. On 7 January 2020, DAVeMoS website (davemos.online) was launched. All newsletters and activities of DAVeMoS can now be read at: https://www.davemos.online/newsletters
3. On 24 March 2020, DAVeMoS first coordination board meeting was held. It was attended by a couple of heads of institutes within BOKU.
4. DAVeMoS workingplan has now been submitted to the FFG
5. DAVeMoS continues to have regular meetings with different funders and relevant stakeholders in Austria.

On the Research:

1. DAVeMoS has been actively seeking external funding and involved in project bidding submissions.
2. DAVeMoS will actively contribute to the forthcoming BMK Österreich Unterwegs 2022 survey as an advisory board member.
3. On 12 February 2020, Professor Susilo was invited to give a lecture on automated bus adoption at the Newcastle University, UK.
4. Professor Susilo presented the results of three articles at the 99th Annual Meeting of the US Transportation Research Board in Washington DC., USA.
5. On 6 January 2020, Professor Susilo contributed to a first page newspaper article about human capacity and industry 4.0.

In Education:

1. Since March 2020, DAVeMoS started contributing in giving courses in the transport planning program at BOKU
2. DAVeMoS team has started supervising 2 master thesis on the paradox of the autonomous vehicle and in exploring the mobility solutions in rural areas in Südburgenland.

9. List of DAVeMoS publications (10/19-03/20)

Peer-reviewed journal:

1. Alhassan, I.B., Matthews, B., Toner, J., Susilo, Y. (2019) Revisiting public transport service delivery: exploring rail commuters' attitudes towards fare collection and verification. European Journal of Transport and Infrastructure Research Issue, 19(4), pp. 310-331, ISSN: 1567-7141.

Book:

1. Baltzarek, V. (2019) Automatisiertes Fahren in der Stadt. Abschätzung möglicher Auswirkungen der Einführung von automatisierten Fahrzeugen auf die Stadt und die Stadtplanung. Beiträge zu einer ökologisch und sozial verträglichen Verkehrsplanung 1/2019, Wien

Book Chapter:

1. Abenoza, R., Romero-Torees, J., Cats, O., and Susilo, Y.O. (2020) User experiences and perceptions of women-only transport services in Mexico, *Gendering Smart Mobilities*, edited by Tanu Priya Uteng, Lena Levin, and Hilda Rømer Christensen, Routledge.

Conference Presentations:

1. Guo, J., Susilo, Y.O., and Pernestål, A. (2020) Temporal Elements of Expectation and Perception in Adopting Autonomous Buses Services. The 99th US Annual Transportation Research Board Meeting 2020, Washington D.C., USA.
2. Rubensson, I., Susilo, Y.O., and Cats, O. (2020) Fair Accessibility – Operationalizing the Distributional Effects of Policy Interventions. The 99th US Annual Transportation Research Board Meeting 2020, Washington D.C., USA.
3. Alhassan, I., Matthew, B., Toner, J., and Susilo, Y.O. (2020) Public Transport Users' Valuation and Willingness-to-Pay for a Multi-Regional and Multi-Operator Integrated Ticketing System. The 99th US Annual Transportation Research Board Meeting 2020, Washington D.C., USA.
4. Gühnemann, A., Roider, O., Klementschitz, R. (2019) System Analysis of Use Cases for Autonomous Shuttles to Fill the Rural Transport Supply Gap. 47th European Transport Conference 2019, 9-11 October 2019, Dublin, Ireland
5. Pfaffenbichler, P., Gühnemann, A., Klementschitz, R., Emberger, G.; Shepherd, S. (2019) Societal impacts of highly automated cars using the toolbox of System Dynamics. 47th European Transport Conference 2019, 9-11 October 2019, Dublin, Ireland
6. Gühnemann, A., Roider, O., Klementschitz, R. (2019) Development of a system dynamics model to analyse the potential demand for an autonomous shuttle bus in rural transport. 1st Workshop on the Application of System Dynamics (SD) in Mobility and Transportation, Germany, Sept 13th, 2019, Munich