

SHORT TERM SCIENTIFIC MISSION (STSM)

Scientific Report

Modelling the quality of user perceived experience

by Aleksandar Karadimce

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STSM Title:

Modelling the quality of user perceived experience

STSM start and end date:

12/03/2018 to 10/04/2018

Host

Dr. Giuseppe Lugano

Host Institution:

UNIVERSITY OF ŽILINA, Žilina, SK

STSM Report

Purpose of the STSM

The STSM was carried out at University Science Park of the UNIVERSITY OF ŽILINA (UNIZA) in Zilina, Slovakia. Specifically, Mr. Karadimce was hosted as visiting researcher of the ERAdiate team. Mr. Karadimce contributed to the outputs of two projects implemented at UNIZA, namely ERAdiate and MoTiV.

ERAdiate (Enhancing Research and Innovation Dimensions of the University of Zilina in Intelligent Transport Systems) is an ERA Chair pilot project funded under the FP7 Pilot (2014-2019). As part of the H2020 pillar “Spreading Excellence and Widening Participation”, it is expected to close the research and innovation gap in EU. The main mission is to build an attractive and internationally competitive environment at UNIZA through the development of human resources and maximization of research infrastructure exploitation. It has active involvement in three COST Actions (CA15212 on “Citizen Science to promote creativity, scientific literacy and innovation throughout Europe”, CA16222 on “Wider Impacts and Scenario Evaluation of Autonomous and Connected Transport” and TU1305 “Social Networks and Travel Behaviour”, which recently ended). The ERAdiate team is implementing the H2020 project MoTiV (Mobility and Time Value): this project addresses emerging needs and perspectives on Value of Travel Time (VTT), a relevant research area particularly valuable to decision-makers, transportation planners, engineers, and economists in the context of projects aiming at enhancing transportation infrastructure.

The STSM of Mr. Karadimce contributed to provide valuable suggestions and to define research hypothesis for the refinement of the MoTiV conceptual framework, which is focused on better understanding the travellers’ perspective to value of travel time by means of smartphone-based data, which will be voluntarily collected by MoTiV data collection participants. In brief, the MoTiV project adopts a citizen science approach to better shape user-friendly transport and mobility systems. The main goal of the MoTiV project is to contribute to advance research on VTT by introducing a conceptual framework for the estimation of VTT at an individual level based on the value proposition of mobility. The conceptual framework will be validated through data collection and evaluation in at least 10 EU countries. The mobility and behavioral dataset will be collected using a mobile application developed by the project consortium, which will combine and integrate into an innovative way features from a multi-modal “journey planner” and an “activity/mobility diary”. With this mobile app, end-users will be able to more easily track, understand, and re-evaluate travel decisions to make the most of their free time in accordance with personal preferences, lifestyle, interests, and budget. The target is to engage in the data collection process a minimum of 5.000 participants actively using the MoTiV app for at least two weeks. Besides validating the conceptual framework, the dataset will be made available to the scientific community as an Open Dataset to stimulate further research in this area. The project outcomes are expected to be relevant both for the scientific community involved in studies on VTT and for policymakers and solution developers shaping the value propositions of travel time.

This STSM will explore the potential of the ordinary people to directly utilize the power of mobile devices, which allows them to collect the mobile sensory data and to report the perceived quality of travel time. In this way, citizens will better appreciate the time spend while traveling and at the same time collectively contribute by providing a complete picture of VTT to sustainable transport planners in the future. Moreover, these outcomes are directly related to the main objectives of COST Action CA15212 that uses citizen science to promote creativity, scientific literacy, and innovation throughout Europe.

Description of the work carried out during the STSM

During the STSM Aleksandar Karadimce actively participated on 14 March at the ERAdiate Lecture Series "Current Trends and Future Perspectives on Sustainable and Smart Mobility". On this event, the perspectives on sustainable and smart mobility systems were described, from different angles. The invited speakers highlighted the need for more wider research studies adopting a richer, more holistic, traveler perspective in sustainable and smart mobility planning. Also, special attention should be given to diversity, namely the types of users and in terms of preferences to be addressed in designing or enhancing a transport system to make worth use of time while traveling. In this lecture series, the main focus was given on two relevant and interrelated trends, namely the evolving nature of travel time and the requirement for equity and accessibility.

Invited speakers:

- Dr. Floridea di Ciommo, cambiaMO Cooperative Society (Spain)
- Intelligent Transport Systems and ethical design in terms of ecological and social sustainability
- Dr. Yannick Cornet, ERAdiate Team Member, Univ. of Žilina (Slovakia)
- Reasonable Travel Time: The Traveller's Perspective of Travel Time
- Dr. Giuseppe Lugano, ERAdiate Team Member, Univ. of Žilina (Slovakia)
- Outlook on Value of Travel Time: Futures Study and Related Hypotheses

Knowledge gathered at the ERAdiate Lecture Series was propedeutic to the core of the STSM work, carried out in the subsequent weeks.

To present the research activities and support additional collaborations opportunities between the two institutions, Mr. Karadimce's PhD work and the portfolio of his institution research and education activities were illustrated on 27 March in the presentation "Modelling the quality of user perceived experience" delivered to ERAdiate researchers and the UNIZA Faculty of Electrical Engineering. This faculty was represented by Dr. Peter Počta, who is actively involved in the standardization on Quality of Experience and Internet of Services through other COST Actions (QUALINET, ACROSS and AAPELE).

The STSM was an opportunity to conduct background research and network with experts in the field of Intelligent Transport Systems (ITS) at UNIZA. In the context of MoTiV, the research opportunity was carried out in direction of using smart services to improve the process of estimation and delivery of content for mobile users while traveling. Initially, we identified the main research challenges and the establishment of hypothesis to be verified during the MoTiV data collection campaign, once the MoTiV app is implemented.

In practice, the main outcome of the visit from a research viewpoint was the work done in the field of Value of Travel Time (VTT), in particular on the quality of travel experience. The hypotheses were generated from the review of relevant literature selected as an input for the development of the conceptual framework on the value of travel time. Research conducted during this STSM will be used to refine the conceptual framework for the estimation of VTT grounded on the notion of Value Proposition of Mobility (VPM). The multi-dimensional VPM has been mapped with the input on the data collection of mobility and behavioral experience that will be used for the MoTiV mobile application requirements specification. Therefore, different sets of predictors that will determine the needed data will be collected to verify all the hypotheses proposed. The outcome of this STSM will be visible as an acknowledgment of contribution to the deliverable "D2.2– Mobility and Travel Time Report" of the MoTiV project.

Description of the main results obtained

Development of the mobile technology and ICT has significantly increased the user's flexibility and mobility. Variety of mobile applications have potential to improve social interaction, working habits, and enjoyment. Availability of mobile services gives more opportunity to leverage the quality of time spent in traveling. Travelers needs and preferences change, meaning that some aspects, such as comfort and enjoyment are more meaningful to some, whereas others prioritise availability of services provide more efficiency or productivity. Moreover, the value of time spent while traveling has a subjective dimension and it can change based on the endogenous and exogenous factors. The main challenge of this STSM was to study and understand the traveler's attitudes to both mobility and travel time. This has contributed to advance the research on Value of Travel Time (VTT) by introducing a conceptual framework for the estimation of perceived quality at an individual level based on the value proposition of mobility.

From the perspective of citizens, the STSM provided an insight on how citizens can actively engage and contribute to estimating the quality of travel time, hence providing useful feedback to mobility stakeholders (public and private ones) on the development of smart mobility infrastructure and services. In near future (e.g. MaaS context), each individual will have a personalized user profile with customized travel preferences and a possibility to express its perceived quality expectations. By collecting and analyzing a rich dataset obtained via smartphone app (such as the MoTiV app), citizens will have a better understanding of their time spend while traveling and a visual presentation of their mobility behaviors. Another important aspect concerns the collection of data on the whole journey experience, including planning (i.e. door-to-door) and covering data on the multi-tasking of activities while traveling, waiting and arriving at the destination. This is a new trend, since in the past the focus was on travel time to destination and activities at destination (based on a given travel purpose).

The outcomes of this STSM provide a more clear understanding of the human-perceived value of travel time, in relation to their needs, expectations, and lifestyles. This research is strongly related to the general objective of the Action CA15212 WG 5, which requires integrating data and knowledge collated through citizen science initiatives and suggest mechanisms for standardization, interoperability, and quality control.

FUTURE COLLABORATIONS (if applicable)

Over the course of the STSM, we have established successful collaboration with the members of the ERAdiate Team and UNIZA Faculties, which we intend to strenghten. In the context of the MoTiV project, in addition to the collaboration on the deliverable "D2.2– Mobility and Travel Time Report" of the MoTiV project, the work done will contribute to the improvement of the MoTiV mobile application requirements mapping the data to collect on mobility and behavioral aspects of the travel experience.

At the level of institutional collaboration, during the STSM possibilities for incoming and outgoing researchers mobility were discussed. For example, the [Slovak National Mobility Programme](#) offers scholarship stay for Ph.D. students, university teachers, and researchers. The earliest date of the beginning of the stay is 1 September 2018; the latest date of the beginning of the stay is 31 August 2019. Duration: 1 – 10 months. The scholarship is intended to cover international scholarship holders' living costs in Slovakia (food, accommodation, etc.). Further details: www.scholarships.sk/en/news/academic-year-2018/2019-apply-now



Deadlines:

- 30 April 2018 by 16:00 CET (4 pm) for scholarship stays in the next academic year;
- 31 October 2018 by 16:00 CET (4 pm) for scholarship stays during the summer semester of the current academic year

By collaboration with Prof. Lubos Buzna at UNIZA there are new PhD topics for researchers:

Topic 1: Data-centric modelling and optimisation of electric vehicles charging

Topic 2: Analysis of large datasets in service systems

Prof. Lubos Buzna is a Senior Researcher in the ERA Chair Team at the University Science Park and affiliate of the Faculty of Management Science and Informatics at the University of Zilina as Associate Professor of Applied Informatics. His fields of interests are transportation, operations research and modelling of complex systems. Contact at: <http://frdsa.uniza.sk/~buzna>

Foreseen publications/articles resulting from the STSM (if applicable)

During the next month, a joint publication is planned: a full research paper for the International Conference "Applied Computer Technologies" ACT 2018. The conference takes place on 21 – 23 June 2018 at the University of Information Science and Technology "St. Paul The Apostle" in Ohrid (MK).

Preliminary title of the conference paper: Modelling the quality of user-perceived travel experience. This paper will summarize the main findings and research hypothesis for the MoTiV conceptual framework. Based on the foreseen *objectives* for future collaboration our intention is to have a publication in a peer-review scientific journal.