



Editorial: Advances in Planning for Emerging Transportation Technologies: Towards Automation, Connectivity, and Electric Propulsion

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Editorial on the Research Topic

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BACKGROUND

Transportation systems continue to face significant challenges and opportunities in the context of their social, technical, and economic outcomes (De Neufville and Scholtes, 2011; Kaewunruen et al.; Sinha et al., 2017; De Martinis and Corman, 2018; Bongiovanni et al., 2019; Eker et al., 2019; Eker et al., 2020a; Barmponakis and Geroliminis, 2020; Becker et al., 2020; Eker et al., 2020b; Ahmed et al., 2021). A case in point is the set of ongoing advancements in information and computer technology that offer unprecedented opportunities for realizing or enhancing systems autonomy/automation, and connectivity. These developments continue to lay the building blocks for a new and exciting generation of transportation vehicles and associated infrastructure. This new transformative generation is expected to be characterized by vehicle connectivity and autonomy, emergent transport modes, new operational policies and standards, and enhanced economic productivity. From a social outcomes' perspective, the need for emissions reduction is motivating the promotion of electric propulsion of vehicles, a feature that is particularly indispensable for efficient operations of connected and autonomous vehicles (CAVs). This special issue crystallizes current thinking and future directions regarding some aspects of the science, engineering, and economic issues associated with the development of CAVs and related technologies.

MAJOR HIGHLIGHTS OF CONTRIBUTIONS

The articles in this special issue addressed the outcomes of next-generation transportation from perspectives that include safety, social and equity concerns (Ahmed et al.; Seilabi et al.) technical concerns in terms of mobility and reliability (Rahman et al.; Büchel and Corman; Ha et al.), economic considerations (Seilabi et al.), and outcomes associated with overall sustainability (Ahmed et al.; Seilabi

et al.). Some of the articles in this special issue addressed the issue of transportation demand. For example, Seilabi et al. modeled traveler choices at different levels of market penetration of new technologies as a basis for measuring travel flows and establishing optimal levels of travel credit pricing, and Ahmed et al. explored public perceptions and potential benefits and concerns of a new transport mode, the flying car. In addition, some of the articles recognized that the next-generation technologies will exist not on their own but as part of an amalgamation of concepts so that synergistic benefits can be realized. For example, Ha et al. explained the possible holistic benefits of systems automation and systems connectivity towards transportation system efficiency and safety.

The articles in the special issue showed consistency with the concept of smart cities, a concept that is intertwined with new transportation technologies (Shaheen et al., 2019). This includes the automation and connectedness of smart city entities such as its vehicles (Ha et al.) citizenry, infrastructure and services. Seilabi et al. explained how travelers can use vehicle automation/connectivity features to honor travel credits at specific locations or times-of-day consistent with their lane type and link choices. Ahmed et al. examined the viability of advanced air vehicles to overcome persistent urban problems of traffic congestion and road disrepair.

The articles in the special issue also provided some guidance on future directions for investments and policy to promote the next generation of transportation systems. Ha et al. discussed how the current and future synergies between systems connectivity and autonomy could help generate knowledge that could be used to justify investments related to these technologies. Ahmed et al. offered insights that can inform next-generation policies and standards associated with the gradual advancement of advanced air vehicles and urban air mobility. Seilabi et al. demonstrated how the

transportation agency can keep traditional vehicle travel costs to equitable levels, particularly during early periods of the transition towards the next-generation vehicles. Further, enhanced reliability in travel-time assessment due to enhanced modeling techniques (Büchel and Corman) or due to the use of social media data (Rahman et al.) can help transportation agencies and operators in their tasks of reporting, controlling operations, and disseminating information to not only shippers and travelers, but also to infrastructure planning and policy evaluation units in an agency.

SUMMARY

The articles in this special issue were motivated by advances in information and computer technology that in turn are fostering the development of automated and/or connected transportation systems or acquisition of information that will help realize this emerging generation transportation systems. The articles in the special issue addressed at least one of the following research activity areas associated with this emerging generation: travel demand assessments; policy and planning including assessments of impacts and their variability; road infrastructure management and network modeling to facilitate CAV adoption; alternative modes; and sharing of real-time information via connectivity of personal communication devices. The topic editors are grateful to the Specialty Chief Editor, Section Editors, and the Review Editors.

AUTHOR CONTRIBUTIONS

All authors listed made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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