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Skills for Transforming Transportation



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Issue

The United States transportation sector is currently faced with a wide array of actual and potential new technologies and approaches, which could transform the nation’s transportation system. Even as these new technologies and approaches suggest the possible need for new skills, the nation’s transportation workforce already faces a skills deficit, independent of these new technologies and approaches. This conjuncture suggests the urgency of identifying needed skills for the transportation workforce.

Yet, amid technological innovation, we must not assume that new technologies are necessarily good or desirable, even if they support the transportation system. The purpose of the American transportation system is not simply to reproduce itself but rather to support broader goals which can be framed as “a thriving nation.” Therefore, transportation workers need the skills to identify and facilitate transportation technologies that will specifically support a thriving nation, rather than facilitating all transportation technologies that will further develop the transportation system.

Additionally, although the history of the nation’s transportation system is often read as a litany of technological development, technology is not the only factor in past and possible transportation system change. For example, cultural, political, and social factors can have as great or greater impacts than technology on

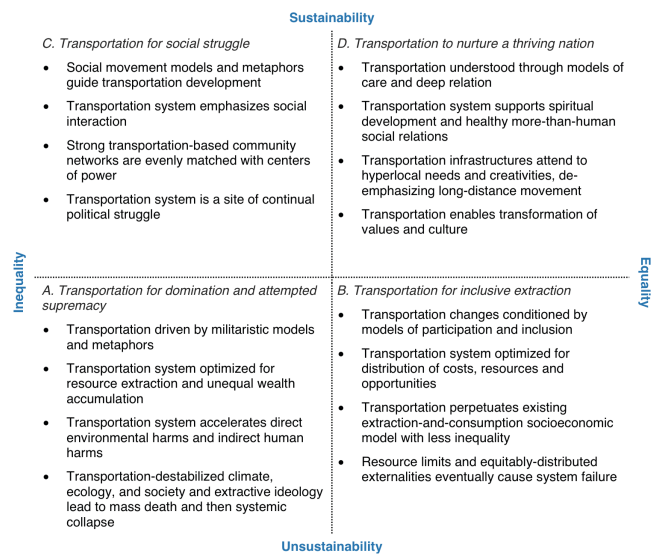


Figure 1: Mapping Transportation Futures on Sustainability and Equality Axes

transportation system change. Therefore, needed skills may engage cultural, political, and social dimensions, as well as technological ones.

Study Approach

This research project focused on three research questions, framed as follows:

1. What innovations, technologies and approaches are needed for the U.S. transportation system to support a thriving nation?

2. What major technologies and approaches are likely to impact the transportation sector in the next decade?
3. What emerging skills are needed in the transportation workforce, for a transportation system that will support a thriving nation?

These three questions were analyzed through a transdisciplinary literature review (including varied scholarly and non-scholarly literatures), comparative analysis, and four futures studies methods (emerging issues analysis, causal layered analysis, futures mapping, and four-quadrant mapping). Much of this project’s analysis can be communicated through a four-quadrant futures map defined by two axes: inequality/equality, and unsustainability/sustainability (See Figure 1).

Research Findings

This research project finds that current trends in technological development position the nation’s transportation system to support unequal and unsustainable outcomes. Emphasis on different technologies, coupled with social, political, and cultural change, could facilitate different futures marked by greater equality and/or sustainability (See Figure 1). In order to support equitable and sustainable outcomes, the transportation workforce would benefit from bolstered skills in three key areas: interaction skills, decision skills, and execution skills.

Needed interaction skills include those supporting: advocacy, communications (including listening), consensus-building (including negotiation and conflict resolution), diversity (to engage and value people from diverse backgrounds, with diverse ways of thinking), emotional intelligence (including self-awareness, self-regulation, social skills, empathy, and motivation), public outreach, teamwork and team-building, and training.

Needed decision skills include those which support: creative imagination, critical thinking, ethical

analysis, historical analysis (relating to deep cultural, environmental, social, political and technological histories), interdisciplinary and transdisciplinary data collection and analysis (enabling thinking in multiple ways from multiple perspectives), systems thinking and more-than-human thinking (to think about the world as networked systems and/or as cooperative and entangled communities including humans and nonhumans), and visioning.

Needed execution skills include: adaptability skills, managerial and leadership skills, planning and organizing skills, problem solving skills, and technological literacy, analysis, and programming skills (especially for understanding and modifying information and communications technologies related to transportation).

Conclusion

- Technology can be helpful but is not a solution to all challenges and can be harmful. Overly focusing on technological solutions can be counterproductive; instead, policymakers should equally consider cultural, political, and social solutions.
- Transportation workers need the skills to effectively question and analyze whether (and under what conditions) particular technologies can serve the goal of a thriving nation. These skills include diversity and emotional intelligence skills; skills for critical thinking, ethical analysis, historical and transdisciplinary analysis, systems thinking, and more-than-human thinking; creative imagination and visioning skills; and problem solving and technological literacy skills.
- Additional skillsets which are needed in the transportation workforce include further skills connected to social interaction (advocacy, communications, consensus-building, public outreach, teamwork, team-building, and training skills) and project execution (adaptability, managerial, leadership, planning, and organizing skills).



This policy brief is drawn from the “Needed Skills in the Transportation Workforce, in the Context of New and Emerging Technologies and Approaches” research report by the UCLA Institute of Transportation Studies. The full report can be found at www.its.ucla.edu/publication/needed-skills-in-the-transportation-workforce/.