Implications of Transformational Technology on the Future Transportation Workforce

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What is transformational technology?

• Terminology: Disruptive vs. transformational vs. advanced
• Some examples from the freight sector:
  • Connected and autonomous vehicles
  • Automation and robotics
  • Alternative fuels
  • Global Navigation Satellite System (e.g. GPS)
  • Internet of Things
  • Machine Learning
  • Unmanned aircraft systems (UAS)
  • Wireless power transfer
  • Delivery drones
  • Truck platooning
  • Vehicle-to-vehicle connectivity
  • Shore power (“cold-ironing”)
Technology and the Informal Economy

• Pursuing informal partnerships with local partners
  • Example: A parcel delivery driver working in the eastern U.S. developed an informal agreement with a local grocery store to park at an unused loading dock to increase productivity.

• Using transformational tech to formalize these partnerships
Technology and Workforce

• Technology increases productivity and creates new opportunities.

• Technology advancements result in automation of mundane tasks.

• Technology focuses on high-skilled and trained workforce.

• Raises the bar of entry-level workforce to possess greater multi-disciplinary skill set.

• Technology particularly useful in freight transportation
Why is freight important?

- Freight supports economic development
- Freight users as early adopters of transformational tech
- Critical need to integrate freight with other modes
- Two key areas where technology will have dramatic impacts:
  - Sustainable freight
  - City logistics

Source: The World Bank
Container Port Traffic for Tanzania
648,100 TEUs in 2016
Sustainable Freight

• Increasing emphasis on environmental stewardship as freight policy
• Changing needs for workforce training and education
Sustainable Freight Challenges and Impacts

Challenges

• Oil to alternative fuel a challenge.

• Financing sustainable infrastructure not a priority.

• Shortage of talent in developing transportation policies.

Impacts

• Countries practice “Avoid-Shift-Improve” approach.

• Sustainability through economic instruments and regulatory policies.

• Thirst for smarter and adaptive talent.

Source: United Nations Conference on Trade and Development - Sustainable freight transport systems: Opportunities for developing countries August 2015

Technology Applications for Freight

- System support for operational efficiency
- Security for assets and users
- Real time scheduling and routing
- Managing information flows in the supply chain
- Intelligent Transportation Systems (ITS)
- Software for measuring fuel efficiency
Urban Logistics

• Unavoidable movement of goods and people in cities.
• New tools for users to interact with their surroundings.
• Example: Conducting walk audits using Collector for ArcGIS.
Workforce Shortages In Transportation

- Levels of Employment in Logistics:
  - Operative staff
  - Administrative logistics staff
  - Logistics supervisors
  - Logistics managers

<table>
<thead>
<tr>
<th>Job Title</th>
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<tbody>
<tr>
<td>Heavy and Tractor-Trailer Truck Drivers</td>
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<tr>
<td>Light Truck or Delivery Services Drivers</td>
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<tr>
<td>Production, Planning, and Expediting Clerks</td>
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<td>General and Operations Managers</td>
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<tr>
<td>Logistics Managers</td>
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<tr>
<td>Industrial Engineering Technicians</td>
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<tr>
<td>Maintenance and Repair Workers, General</td>
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<tr>
<td>Cargo and Freight Agents</td>
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<tr>
<td>Logistics Analysts</td>
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<tr>
<td>Storage and Distribution Managers</td>
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<tr>
<td>First-Line Supervisors of Transportation and Material-Moving Machine and</td>
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<tr>
<td>Vehicle Operators</td>
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<tr>
<td>Transportation Managers</td>
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<tr>
<td>Computer Systems Analysts</td>
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<tr>
<td>First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand</td>
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<td>First-Line Supervisors of Production and Operating Workers</td>
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<td>Database Administrators</td>
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<td>Commercial Pilots</td>
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<td>Civil Engineers</td>
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<td>Operations Research Analysts</td>
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<tr>
<td>Transportation Planners</td>
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Top 20 workforce shortages in transportation sector
What other factors play a role?

• **Political**
  - National trade policy can influence the direction and magnitude of freight flows.
  - Investment in publicly owned infrastructure can spur the incorporation of transformational technologies into transportation networks.
    • Example: installing V2I sensors at traffic intersections

• **Institutional**
  - Freight transportation is transitioning from a dependence on *physical* infrastructure to one on *virtual* infrastructure.
  - Thus, owners of virtual infrastructure will become more important stakeholders in many firms’ supply chains.
Thank You!

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