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## Setting the Agenda: The Legal and Historical Context to Best Understand How Transportation Technology Might Be Regulated to Combat Forced Labor

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**SETTING THE AGENDA: THE LEGAL AND HISTORICAL  
CONTEXT TO BEST UNDERSTAND HOW  
TRANSPORTATION TECHNOLOGY MIGHT BE  
REGULATED TO COMBAT FORCED LABOR**

**BRITTANY EASTMAN<sup>1</sup>**

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I. INTRODUCTION

Transportation is a piece of all human activity. As individuals and as a society, the logistics of getting people and goods from one place to another is a question we answer countless times a day. Just today, billions of people drove to work, took the bus to school, used a rideshare to get to the store, or took the train into the city to enjoy an evening out on the town. This list does not even consider all the items people have ordered online which will be shipped and delivered to homes. Even more exciting is the innovation that inspired all the aforementioned modes of transportation; transportation technology has the amazing potential to make our lives easier, more efficient, and more equitable. But implementing all this technology requires labor, and the technology can only benefit those who have access to it.

Most of us have never truly considered whose labor makes mobility possible. Relatedly, it is hard to imagine life without access to transportation if you are a person who has always known how they will get to work. This article will provide a framework to better understand one type of labor within the industry, exploited labor, also known as forced labor. Forced labor is part of the transportation industry and is also impacted by a lack of transportation. Without reliable and safe transportation individuals are at a higher risk of

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forced labor in other industries. The bottom line is twofold: considering the impacts that an increased demand for new technology will have on people who work in mines, in the supply chain, and in transportation as a service, as well as considering legal tools to maximize access to transportation for historically underserved communities in light of new technology.

All this to say that this article will consider how society might reimagine the regulation of emerging transportation technology in a way that combats the systemic vulnerability that leaves people at risk of forced labor. This will include both the labor being performed to manufacture and operate the technology, as well as the impact on access to transportation of the user and nonuser. Though this article will largely analyze the role of automated vehicles, other innovations including reconfigured public transportation and electrification will also be considered. Transportation is at the heart of everything humanity does and yet this article will only scratch the surface of these issues.

For purposes of this article, I am thinking about forced labor in the transportation industry in four camps: supply chain workers, transportation sector workers, transportation users, and nonusers who are impacted by the effects of emerging technologies such as new infrastructure.

First, this article will explore the historical correlation between transportation innovation and worker exploitation; every major transportation invention from roads in Rome to the construction of high-speed railways has caused significant upticks in forced labor. Next, this article will seek to propose shared language to the transportation industry to facilitate meaningful discussion. It will consider the scope of this topic and provide examples. Lastly, this article is an invitation to engage; because this topic is large in scope and scale, input from a variety of sources is crucial. The ultimate goal of this article is to provide a common language to begin exploring industry impact. An interdisciplinary approach will be crucial.

Before proceeding, this introduction must include something of a disclaimer. This article does not suggest that movement or mobility is a necessary element of forced labor, nor does this article suggest that people should fear new technology. The terms used in this article will be defined as each is used, however these terms are not permanent nor universal. Forced labor certainly exists in many contexts other than mobility, however this article seeks to highlight how transportation technology specifically could exacerbate or combat such exploitation.

## II. LANGUAGE, SCOPE, AND SCALE

Engaging in conversations about forced labor can be challenging. Numerous terms have been used to describe exploitative labor practices including slavery, slave labor, forced labor, labor trafficking, human trafficking, etc. For the purposes of this article, I will rely on the International Labor Organization's definition of forced labor which is: all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily.<sup>2</sup>

The size and scope of forced labor is difficult to define. Some 40 million people today are experiencing forced labor; however, it is nearly impossible to reliably calculate figures.<sup>3</sup> Labor exploitation is hard to quantify and rarely prosecuted because it receives significantly less attention than sexual exploitation.<sup>4</sup> Vulnerability, which is a systemic problem caused by public entities failing to meet people's needs, is at the root of the problem, and a misrepresentation of the cause and frequency of exploitation hinders meaningful solutions.

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<sup>2</sup> International Labor Organization, *Forced Labour Convention*, U.N. Doc. C/29 (June 28, 1930).

<sup>3</sup> Daniela Gross, *Over 40 Million People Still Victims of Slavery*, UN NEWS (Dec. 2, 2018), <https://news.un.org/en/story/2018/12/1027271>.

<sup>4</sup> Kristina Davis, *Horrors of Labor Trafficking Remain Hidden with Spotlight on Sex Trafficking*, THE SAN DIEGO UNION TRIBUNE (Dec. 1, 2019), <https://www.sandiegouniontribune.com/news/public-safety/story/2019-12-01/horrors-of-labor-trafficking-struggle-to-gain-same-public-recognition-as-sex-trafficking>.

But how does this relate to transportation technology? Well, first and foremost, the transportation industry is massive. Between the production of vehicles, the distribution of goods, and the employment of service people, almost 15 million people work in the transportation sector in the United States alone.<sup>5</sup> Of those 15 million, over 90 thousand work in automotive manufacturing<sup>6</sup> (which pales in comparison to the total 1.7 million automotive industry employees just in the United States<sup>7</sup>). These figures do not even consider the 40 million people in the world working in the mining industry<sup>8</sup> to extract the raw materials being used to make the 30 thousand parts in the average car.<sup>9</sup> The ultimate point here is that this industry is massive, lucrative, and requires a lot of labor.

Labor is not always ethical, and blue collar and manual labor positions are more vulnerable to human rights violations than white collar jobs in the industry. The Business and Human Rights Resource Center conducted a study between 2011 and 2018 on the alleged human rights violations in the transportation manufacturing industry (in which the overwhelming majority of employers were automotive part manufacturers and suppliers, but included a variety of raw material sourcing, factory work, large order, and sponsorship).<sup>10</sup> The study concluded that 91.7% of alleged labor rights abuses were

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<sup>5</sup> Bureau of Transp. Stats., U.S. Dep't of Transp., *Employment in Transportation: Employment in Transportation and Related Industries*, <https://data.bts.gov/stories/s/Transportation-Economic-Trends-Transportation-Empl/caxh-t8jd/> (last visited Oct. 20, 2022).

<sup>6</sup> IBIS World, *Car & Automobile Manufacturing Industry in the US - Market Research Report* (last updated Sept. 24, 2022).

<sup>7</sup> Ctr. for Auto. Rsch., *Contribution of the Automotive Industry to the Economics of All Fifty States and the United States* (April 2010), <https://www.cargroup.org/wp-content/uploads/2017/02/CONTRIBUTION-OF-THE-AUTOMOTIVE-INDUSTRY-TO-THE-ECONOMIES-OF-ALL-FIFTY-STATES-AND-THE-UNITED-STATES.pdf>.

<sup>8</sup> Peter Hobson, *More than 40 million people work in artisanal mining: report*, REUTERS (Apr. 24, 2019, 12:17 PM), <https://www.reuters.com/article/us-mining-asm-idUSKCN1S025C>.

<sup>9</sup> *How Many Parts Are in a Car?*, COLLECTORS AUTO SUPPLY, INC. (May 5, 2020), <https://collectorsautosupply.com/blog/how-many-parts-are-in-a-car/>.

<sup>10</sup> Bus. & Hum. Rts. Ctr., *Business & human rights snapshot: Automotive sector* (Nov. 16, 2018).

raised in the automotive parts manufacturing sector.<sup>11</sup> Land rights issues, displacement, and inaccessible natural resources such as clean water were also reported, roughly a third of which were in the raw material mining sector.<sup>12</sup> Environmental degradation and workplace health and safety reports were also overwhelmingly impacting those working in mining.<sup>13</sup>

These statistics concerning those who work in transportation are mirrored in the experiences of those who use various modes of transportation. Older adults, people with disabilities, and low-income people are more likely to experience the transportation barrier.<sup>14</sup> Relatedly, inaccessible transportation exacerbates existing racial and socioeconomic inequalities<sup>15</sup> in the United States particularly by “decreasing mobility and forcing individuals to rely on costly car ownership”.<sup>16</sup> It is worth mentioning that low-income people spend nearly a third of their income on transportation. In 2016, the lowest 20% of earners in the United States, earning just under \$12,000 annually, spent an average of 29% of their income on transportation despite the national average being around 13% of income.<sup>17</sup> Coupled with the fact that only 5% of people commute to work with public transit,<sup>18</sup> this economic burden leaves nonwhite, low-income, disabled, and elderly people disproportionately without access to transportation. Ultimately, this means that inaccessible or expensive transportation options leave marginalized communities without the same access to employment opportunities, and the available

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<sup>11</sup> *Id.* at 2.

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> Wendy Heaps, Erin Abramsohn & Elizabeth Skillen, Public Transportation In The US: A Driver Of Health And Equity, *Health Affairs: Culture of Health* (July 29, 2021), <https://www.healthaffairs.org/doi/10.1377/hpb20210630.810356/full/>.

<sup>15</sup> See, e.g., Todd Litman, Victoria Transp. Pol’y Inst., *Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transport Planning* (Sept. 16, 2022).

<sup>16</sup> Heaps, Abramsohn & Skillen, *supra* note 12 at 2.

<sup>17</sup> The High Cost of Transportation in the United States, *Inst. for Transp. & Dev. Pol’y: Transport Matters* (May 23, 2019), <https://www.itdp.org/2019/05/23/high-cost-transportation-united-states/>.

<sup>18</sup> Michael Burrows, Charlynn Burd & Brian McKenzie, *U.S. Census Bureau, Commuting by Public Transportation in the United States: 2019*, U.S. DEP’T OF COM. (Apr. 2021).

employment opportunities are more likely to be informal, lower-paying, or less safe.<sup>19</sup>

This barrier leaves people vulnerable to forced labor because of a lack of access to safer, more regulated employment opportunities. Creating, supporting, and funding policies that encourage access to transportation is important to improve employment opportunities and reduce the likelihood of experiencing forced labor for communities in the margins.<sup>20</sup>

This context is pivotal as we consider emerging transportation technologies such as automation and electrification because, with meaningful and intentional regulation, technology has the potential to provide better access to transportation than ever before. Though slightly outside the scope of this article, The U.S. Department of Transportation acknowledges that federal, state, and local governments have an obligation to support mobility initiatives for older adults, people with disabilities, and low-income people.<sup>21</sup> Federal interagency initiatives already exist (such as the Coordinating Council on Access and Mobility) to consider how to facilitate the deployment of automated vehicles in a way that serves historically underserved populations.<sup>22</sup>

Carrying this transportation equity momentum through the transportation revolution as automation and electrification become more common is crucial. Transportation technology has a habit of serving wealthy white communities (who are overwhelmingly more likely to have access to safer, less exploitative employment opportunities) far before low-income communities of color. Existing studies are few and far between, but currently suggests that automated vehicle deployment in our current legal framework could

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<sup>19</sup> Ana I. Moreno-Monroy, *Access to Public transport and Labor Informality*, IZA WORLD OF LAB. (July 2016).

<sup>20</sup> Jerome Bastiaanssen, Daniel Johnson & Karen Lucas, *Does transport help people to gain employment? A systematic review and meta-analysis of the empirical evidence.*, 40 – 5 TRANSPORT REVIEWS (2020) at 607.

<sup>21</sup> *E.g.*, Dep't of Transp., Off. of Disability Emp. Pol'y, Transportation, Transportation | U.S. Department of Labor (dol.gov)

<sup>22</sup> *Id.*

improve mobility for older adults, teenagers, middle class rural residents, and people with disabilities.<sup>23</sup> However, automation may have fewer positive effects on nonwhite people, low-income people, and women.<sup>24</sup>

This article seeks to facilitate a conversation about law and policy best practices to ensure the next transportation revolution closes the access to transportation gap. This article will set the agenda and provide context for a conference on the topic hosted by the Law and Mobility Program at the University of Michigan Law School. The conference will be followed by a subsequent report of the recommendations developed by panelists, participants, and interviewees. As such, this article is not sharing the findings of a conclusive study, but rather is identifying a problem, seeking out interdisciplinary experts, and calling people with relevant knowledge to engage so we may develop holistic regulatory solutions.

### III. A BRIEF HISTORICAL CONSIDERATION

Innovation has correlated with upticks in forced labor throughout human history. Understanding the historical relationships between technology and forced labor can help predict if and how inequality will be exacerbated by transportation technology, namely automation and electrification.

An early example comes from ancient Rome. Technically, ancient Rome was not particularly inventive, but rather appropriated the technology of its colonies.<sup>25</sup> Enslaving people was a common practice in ancient Rome and the labor of enslaved people largely implemented the technologies that were stolen via imperialism.<sup>26</sup> The

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<sup>23</sup> Xiny Wu, Jason Cao & Frank Douma, *The impacts of vehicle automation on transport-disadvantaged people*, 11 *TRANSP. RSCH. INTERDISC. PERSP.* 1, 3 (2021).

<sup>24</sup> *Id.* at 3-4.

<sup>25</sup> THE BRITISH MUSEUM, *SLAVERY IN ANCIENT ROME*, <https://www.britishmuseum.org/exhibitions/nero-man-behind-myth/slavery-ancient-rome>; *Ancient Roman Slaves: A Life of Bondage*, *HIST. ON THE NET* (2022), <https://www.historyonthenet.com/ancient-roman-slaves> (last visited Oct. 20, 2022).

<sup>26</sup> *Id.*

labor of enslaved people was used to construct roads and the infamous systems of aqueducts.<sup>27</sup> It is hard to properly calculate the extent of slavery, however it is obvious that enslavement was a significant part of Roman culture and that the development and expansion of the road network created a cyclical relationship between imperialism and slavery. As the Romans used the labor of enslaved people to build roads outwards for the sake of imperialism, expansion allowed the Roman soldiers to further enslave additional people for more labor to continue building out the empire.<sup>28</sup>

Another historical example of transportation innovation increasing forced labor comes from American railroads. Though American trains are generally considered to have fallen behind many other railroad networks in the world, the American railways of the 1860s were the pinnacle of American industrialization. Enslaved people's labor became so crucial to the development of the railroad (and was so expensive due to the increase in cotton production in the 1840s) that stockholders were permitted to purchase stock in exchange for enslaved people.<sup>29</sup> This point is particularly salient because the railroad system would have been impossible without the forced labor of thousands of Black people, however the very same rail networks did not permit Black riders for nearly a century.<sup>30</sup> When Black people were permitted to use the train, access was limited, segregated, and utilized aging infrastructure.<sup>31</sup> Consequently, the impact of racist railroad policies caused generations of obstacles in

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<sup>27</sup> PBS, THE ROMAN EMPIRE: IN THE FIRST CENTURY, [https://www.pbs.org/empires/romans/empire/slaves\\_freemen.html](https://www.pbs.org/empires/romans/empire/slaves_freemen.html) (last visited Oct. 4, 2022).

<sup>28</sup> SLAVERYINJUSTICE, SLAVERY IN ANCIENT ROME, <https://slaveryinjustice.wordpress.com/slavery-in-ancient-rome/> (last visited Oct. 4, 2022); HIST. ON THE NET, *supra* note 25.

<sup>29</sup> Steven G. Collins, *Progress and Slavery on the South's Railroads*, 181 R.R. HIST. 6, 7-16 (1999).

<sup>30</sup> *Mitchell v. United States*, 313 U.S. 80 (1941); Alex Palmer, *This Segregated Railway Car Offers a Visceral Reminder of the Jim Crow Era*, SMITHSONIAN MAG. (Jun. 13, 2016), <https://www.smithsonianmag.com/smithsonian-institution/segregated-railway-car-offers-visceral-reminder-jim-crow-era-180959383/>.

<sup>31</sup> See *Plessy v. Ferguson* 163 U.S. 537 (1896); Lily Rothman, *The Long Death of the 'Separate but Equal' Doctrine*, TIME (May 18, 2016), <https://time.com/4326692/plessy-ferguson-history-120/>.

accessing transportation for Black Americans. The same transportation technologies that were constructed with the forced labor of Black people were also not serving Black people, not running routes through Black neighborhoods, or were providing worse service to nonwhite communities.<sup>32</sup> This dynamic is a systemic failure that still impacts current access to transportation initiatives for both public transit as well as personal vehicle ownership.

Continuing with another American example, highway infrastructure in the United States was built out after the enactment of the Federal Aid Highway Act of 1956 with federal funding.<sup>33</sup> Some 41,000 miles of highway were strategically placed to serve upper-middle class communities and were built directly through nonwhite neighborhoods.<sup>34</sup> Sometimes the disenfranchisement was intentional, and the government often used eminent domain to seize homes.<sup>35</sup> The psychological and communal harm caused by the displacement disrupted the development of nonwhite communities by limiting access to employment, education, and other resources. This is an important piece of the transportation equity conversation because it showcases how transportation is more than just cars and trains; it is the fabric of how our infrastructure is built and the impact of transportation policy throughout the twentieth century.

This pattern of exploitation and exclusion will be especially true as new technology is expensive and often inaccessible to marginalized communities in the early days of implementation. As a consequence of historical injustice in transportation, the development and regulation of transportation technology of today (and tomorrow)

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<sup>32</sup> Alison Rose Jefferson, *The Transcontinental Railroad, African Americans, and the California Dream*, CAL. HIST. SOC'Y (June 17, 2019), <https://californiahistoricalsociety.org/blog/the-transcontinental-railroad-african-americans-and-the-california-dream/>.

<sup>33</sup> Richard F. Weingroff, Dep't of Transp., Fed. Highway Admin., *Federal-Aid Highway Act of 1956: Creating the Interstate System*, 60 1 PUBLIC ROADS (1996).

<sup>34</sup> *Id.*

<sup>35</sup> *E.g.* Kohl v. United States, 91 U.S. 367 (1875); Loretto v. Teleprompter Manhattan CATV Corp. 458 U.S. 419 (1982); Kelo v. City of New London, Connecticut, 545 U.S. 469 (2005).

must prevent exacerbating the existing framework for the community at large.

#### IV. TRANSPORTATION TECHNOLOGY AND MINING

The first category of forced labor is in the supply chain, which is largely made up of the mining of raw materials required to manufacture the component parts in various modes of transportation. This category is huge; the average car requires 30,000 parts, which pales in comparison to the whopping 6 million pieces that make up the average plane.<sup>36</sup> Notably, there is very little research about the working conditions fostered to make many of the aforementioned parts. Because forced labor has a much larger scale than most can imagine, coupled with the fact that many of the mines and factories used to manufacture these parts are unregulated and unmonitored, the exploitative labor conditions are surely more severe than industry leaders' reports reflect.<sup>37</sup>

Transportation technologies, namely automation and electrification, and their relationship with the supply chain can mean a few things. First, this relationship includes the labor implications of the increased demand for raw materials that will be created by the transportation revolution. An example of this comes from the conditions under which Congolese miners will work in light of the heightened need for cobalt to make lithium-ion batteries for electric vehicles,<sup>38</sup> which will be particularly relevant if the assumption that fully automated vehicles will be entirely electric proves to be true. Second, transportation technologies will have a profound impact on workers in the supply chain because automation has the potential to

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<sup>36</sup> COLLECTORS AUTO SUPPLY, *supra* note 9.

<sup>37</sup> Andrew Alvarado-Sieg & Brian Huerbsch, *Uncertainty and Risk in the Global Automotive Industry: Changing Behaviors and Growing Disruption*, THOMSON REUTERS (2017), <https://www.thomsonreuters.com/content/dam/ewp-m/documents/thomsonreuters/en/pdf/reports/global-automotive-industry-report-thomson-reuters.pdf>.

<sup>38</sup> Todd C. Frankel, *The Cobalt Pipeline: Tracing the Path from Deadly Hand-Dug Mines in Congo to Consumers' Phones and Laptops*, WASHINGTON POST (Sept. 30, 2016), <https://www.washingtonpost.com/graphics/business/batteries/congo-cobalt-mining-for-lithium-ion-battery/>.

alleviate some of the grueling manual labor and long hours workers currently endure. This point is nuanced, however, because it confronts the narrative that automation in all forms will negatively impact human jobs. Though it is outside the scope of this piece, it is worth noting that the concern about protecting jobs is well-founded and many scholars propose the only equitable solutions will include universal basic income to compensate for jobs lost due to various forms of automation.<sup>39</sup> Lastly, as the next section of this article will address, transportation technologies' impact on the supply chain includes the effects on workers who transport and store materials in addition to those who mine the raw materials.

Expanding upon the example of Congolese cobalt mines, approximately 70% of the world's cobalt is extracted in Congo.<sup>40</sup> The demand for cobalt has already increased but is on track to skyrocket by 2050 as a result of the COP26 Climate Conference commitment to net-zero carbon emissions.<sup>41</sup> This transition is complicated because net-zero carbon emissions are likely a nonnegotiable facet of combating the climate crisis, however the mining industry is rife with human rights and labor injustices. Rights and Accountability in Development (RAID), an organization that seeks to hold corporations accountable for their role in protecting human rights, published a report in November of 2021 on electric vehicles and industrial cobalt mines.<sup>42</sup> The report concluded that despite industry efforts to portray human rights violations as a characteristic of artisan mines, nearly 80% of mines in Congo are industrial mines predominantly operated by multinational corporations.<sup>43</sup> RAID's research at five of the largest industrial mines

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<sup>39</sup> Katherine Miller, *Radical Proposal: Universal Basic Income to Offset Job Losses Due to Automation*, STANFORD UNIV. HUM.-CENTERED A.I. (Oct. 20, 2021); *Radical Proposal: Universal Basic Income to Offset Job Losses Due to Automation* (stanford.edu).

<sup>40</sup> U.S. Geological Surv. *Mineral commodity summaries 2020*, U.S. GEOLOGICAL SURV. 1, 51(2020), <https://doi.org/10.3133/mcs2020>.

<sup>41</sup> UN Climate Change Conference UK 2021, *COP26 The Glasgow Climate Pact*, (2021). *COP26-Presidency-Outcomes-The-Climate-Pact.pdf* (ukcop26.org).

<sup>42</sup> RAID, *The Road to Ruin? Electric vehicles and workers' rights abuses at DR Congo's industrial cobalt mines*, RAID (Nov. 2021), [report\\_road\\_to\\_ruin\\_evs\\_cobalt\\_workers\\_nov\\_2021.pdf](https://raid-uk.org/report_road_to_ruin_evs_cobalt_workers_nov_2021.pdf) (raid-uk.org).

<sup>43</sup> *Id.*

in the country included reports from and interviews of workers who stated they endure long hours, discrimination, violence, embarrassing or degrading treatment, and unsafe working conditions among other abuses.<sup>44</sup> Workers also reported earning far below the living wage of \$402 monthly and 63% of people interviewed who were earning extremely low wages were hired as subcontractors.<sup>45</sup> Interviewees reported that they believe multinational mining companies intentionally hire an exorbitant number of subcontractors to reduce the cost of labor and limit legal liability to those who should rightfully be hired as employees.<sup>46</sup>

Citing the importance of mining for the future of electrification (both in technological and environmental pursuits), organizations such as RAID call on automotive industry giants to end contracts with cobalt suppliers who violate international and Congolese labor standards.<sup>47</sup> Relatedly, watchdog groups call multinational mining companies to end the gratuitous use of subcontracting firms as a tool to cut costs, to pay both employees and subcontractors a living wage, and to investigate claims of discrimination and violence in the mines.<sup>48</sup> In addition to corporate social responsibility, the conversation must include action by governments and international organizations. In anticipation of the transportation revolution, frameworks such as mandatory human rights due diligence laws must enter the conversation.<sup>49</sup> Sustainability is an immediate goal of transportation technologies; however, the movement is not sustainable if it is not ethical.

## V. IMPACTS OF EMERGING TECHNOLOGY ON PEOPLE WORKING IN THE TRANSPORTATION INDUSTRY

The American transportation industry provides millions of jobs, employing approximately 13.3 million people in 2017.<sup>50</sup> This figure

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<sup>44</sup> *Id.*

<sup>45</sup> *Id.* at 4.

<sup>46</sup> *Id.*

<sup>47</sup> *Id.* at 9.

<sup>48</sup> *Id.*

<sup>49</sup> *Id.* at 61-63.

<sup>50</sup> Bureau of Transp. Stats., *supra* note 5.

includes truck drivers, warehouse employees tasked with loading cargo, bus drivers, couriers, and air travel employees among many others. The Department of Transportation considers all transportation-related jobs when drafting its reports, which includes storage, distribution, and maintenance.<sup>51</sup> Truck drivers and warehouse employees in particular are vulnerable to forced labor as a result of the deregulation and racialization of the industry.<sup>52</sup> For example, many of the efforts made in the 1990s to eliminate exploitative labor practices in transportation both domestically and abroad never impacted the industry in Southern California.<sup>53</sup>

Hundreds of Californian truckers have explained to lawmakers and journalists that they were coerced into labor contracts that they did not understand (or were blatantly lied to about the terms) and subsequently were each over \$100,000 in debt to their own employers.<sup>54</sup> The Motor Carrier Act of 1980 terminated most government regulation and consequently wages plummeted, local competition skyrocketed, and contingent labor by port truckers was frequently misclassified as “owner-operator” labor.<sup>55</sup> The conditions were described as “sweatshops on wheels”.<sup>56</sup> The effects of deregulation in California are still felt intensely by workers. In October of 2021, the U.S. Supreme Court refused to hear a trucking company’s claim that California’s new worker classification law (which threatens the current classification that categorizes truckers who own their trucks as independent contractors) is preempted by federal labor regulation.<sup>57</sup> However, the Court has not yet decided whether to take up a similar writ of certiorari by the California Trucking Association, which seeks to appeal a 9th Circuit decision

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<sup>51</sup> *Id.*

<sup>52</sup> Jake Alimahomed-Wilson, *Unfree Shipping: The Radicalisation of Logistics Labour*, 13 WORK ORG., LAB., & GLOBILISATION 96, 98-100 (2019).

<sup>53</sup> *Id.* at 97.

<sup>54</sup> Brett Murphy, *Retail Giants Enable Trucker Exploitation*, USA TODAY, Jun. 29, 2017.

<sup>55</sup> The Motor Carrier Act of 1980, 96 P.L. 296, 94 Stat. 793 (1980).

<sup>56</sup> Michael H. Belzer, *Sweatshops on Wheels: Winners and Losers in Trucking Deregulation*, 54 INDUS. AND LAB. REL. REV. 1 (2000).

<sup>57</sup> Daniel Wiessner, *No SCOYUS Review of California Law’s Impact on Trucking Industry*, REUTERS, Oct. 5, 2021.

regarding whether the law applies to truck drivers at all.<sup>58</sup> In sum, truck drivers and warehouse workers are among the millions of employees working in the transportation industry who are being exploited in no small part due to complicated, predatory, and incomplete regulatory frameworks. Immediate legal relief is lacking.

Automation is one of the transportation technologies with the potential to revolutionize labor in the transportation industry, and not all stakeholders are excited. Mentions of automation taking human jobs are common.<sup>59</sup> However, research in recent years suggests that workers in the transportation industry are overworked, underpaid, and undervalued, and automation may offer a reprieve.<sup>60</sup> This conclusion is in stark contrast to studies published by business media platforms such as Forbes, which conducted a study in 2020 that concluded 60% of warehouse owners surveyed were “very likely” to invest in warehouse automation, citing an alleged labor shortage as a primary incentive.<sup>61</sup> The latter further complicates the discourse about automation by framing emerging technologies as an efficient replacement for human labor due to a belief by the company executives that truckers and warehouse workers are somehow unwilling to work, rather than identifying and correcting forced labor practices.<sup>62</sup> Though both framings have similar results (i.e., implementing automated technologies to move goods around), only the former accounts for the lived experiences of workers and the ability of automation to alleviate the physically demanding work and long hours.

Providing shared language to talk about the forced labor of workers in the transportation industry shifts the blame from the workers to the systemic failures. The aforementioned Forbes study concluded by stating “some of their clients are reporting that not all of their

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<sup>58</sup> *Id.*

<sup>59</sup> Alana Semuels, *Millions of Americans Have Lost Jobs in the Pandemic—And Robots and AI Are Replacing Them Faster Than Ever*, TIME, Aug. 6, 2020.

<sup>60</sup> Michael Sainato, ‘Completely Demoralized’: US Railroad Workers Pushed to the Brink, THE GUARDIAN, Mar. 14, 2022; Michael Belzer, *Truck Drivers are Overtired, Overworked, and Underpaid*, THE CONVERSATION, Jul. 25, 2018.

<sup>61</sup> Steve Banker, *Automation is the Future of Warehousing*, FORBES, Jul. 31, 2020.

<sup>62</sup> *Id.*

workers wanted to come back to work because, in their feeling, the unemployment benefits workers were getting were too generous”.<sup>63</sup> The perspective of the workers, however, is that in light of the longstanding tradition of wildcat strikes among port drivers being met with absolute silence, unemployment benefits and more generous debt-repayment programs during the pandemic are more worthwhile.<sup>64</sup> The unregulated industry has ironically created an underground bureaucracy of sorts, which has silenced the voices of millions of workers. The regulation of new automated technologies must include new, explicit definitions of who or what constitutes a “driver”, which opens the door for more and better classifications of those working in the transportation industry.

## VI. IMPACTS OF TRANSPORTATION TECHNOLOGY ON THE USER

Connected and automated vehicles have unbelievable potential to provide more access to transportation for people who have historically been excluded from traditional mobility initiatives.<sup>65</sup> This may include rural communities, people with disabilities, low-income people, people who work at unconventional times, and children who are too young to drive. The transportation revolution is a chance to rethink how we connect people with goods, services, and opportunities. According to the National Conference of State Legislatures, unemployment is twice as high for people with disabilities for example.<sup>66</sup> As Michael Reardon, who is a supervisory policy advisor in the Disability Employment Policy office of the Department of Labor, stated “[P]eople with disabilities don’t have access to transportation to get jobs. Two-thirds of the counties in the United States don’t have public transportation. People with disabilities’ participation in the workforce is about a third of the level

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<sup>63</sup> *Id.*

<sup>64</sup> Greg Iacurci, *6 Reasons Why Americans Aren’t Returning to Work*, CNBC, Oct. 20, 2021.

<sup>65</sup> Olivia Fiol & Sophia Weng, *Shared Autonomous Vehicles Could Improve Transit Access for People with Disabilities if Regulated Appropriately*, URB. INST., Oct. 4, 2022.

<sup>66</sup> Mark Wolf, *How Autonomous Vehicles Can Affect People with Disabilities*, THE NCSL BLOG, Dec. 10, 2019.

of the non-disabled population”.<sup>67</sup> Though the specifics are outside the scope of this piece, many American towns remain segregated and car-centric, which means those who do not drive a car often cannot afford or access another means to get to work, making millions of Americans too poor to commute to a job.<sup>68</sup>

Automation of both personally owned vehicles as well as public transportation may answer some access to transportation questions for a variety of users, which may reduce vulnerability. Public transportation has received a lot of attention in the last half century, particularly research on the relationship between employment and the distance between home and work (known as urban sprawl).<sup>69</sup> While personally owned automated vehicles may serve the transportation needs of those who cannot drive a vehicle without automated capabilities due to age or disability, automated public transportation may better serve low-income communities.<sup>70</sup> Full automation may also lend itself to shared ownership of vehicles that keep the cost of ownership lower and can efficiently transport those who live or work in the same neighborhood.<sup>71</sup> Lastly, automation has the potential to address the first-mile/last-mile problem (FMLM), which describes the distance between a person’s home and the public transit hub they use for the majority of their commute.<sup>72</sup> Though a community may have a public bus system, for example, the bus station may be difficult to get to from people’s homes because of unwalkable streets, a lack of bike lanes, or inclement weather. Automated shuttles have the potential to better connect commuters to transportation hubs by making FMLM more manageable.

Thoughtful development and implementation of transportation technology could reduce vulnerability by allowing people to regain

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<sup>67</sup> *Id.*

<sup>68</sup> Kyle DeMaria, *Getting to Work on Time*, FED. RSRV. BANK OF PHILA., Jan. 2018.

<sup>69</sup> Thomas W. Sanchez, Assistant Professor, Portland State University, Association of Collegiate Schools of Planning Annual Conference (November 4-7, 1998).

<sup>70</sup> Abood Mourad, Jakob Punchinger, & Chengbin Chu, *Owning or Sharing Autonomous Vehicles: Comparing Different Ownership and Usage Scenarios*, 11 EUR. TRANSP. RSCH. REV. 1, 2-5, 2019.

<sup>71</sup> *Id.*

<sup>72</sup> First Mile/Last Mile, 86 Fed. Reg. 50421 (Sept. 8, 2021).

control of their commute to secure employment outside of their neighborhoods in a way that is reliable, consistent, and dignified.

## VII. IMPACTS OF TRANSPORTATION TECHNOLOGY ON THE COMMUNITY AT LARGE

As with all technological advancements, not everybody will instantly have access to transportation technologies, particularly automation. Transportation is vital to all human activity, and the right to travel has been expressly recognized both domestically and internationally.<sup>73</sup> Despite the right to travel being widely accepted as a right, having a means and method by which to travel is not. Moreover, the advent of new technologies often exacerbates existing injustice and full automation will likely be no exception.<sup>74</sup> Will transportation be summoned using a smartphone? If so, how will those who do not or cannot use a smartphone schedule a ride or buy a ticket? Will automated vehicles facilitate a world where employment, food, and recreation are all even further from low- and middle-income neighborhoods? Is the prediction that automation will make commutes longer with passenger-miles traveled increasing by 25% relatively accurate?<sup>75</sup> How will sprawl impact accessibility initiatives? Will automated systems speak multiple languages? Will deep learning software recognize pedestrians wearing burkas or babies in strollers?

Conversations about infrastructure in an automated world often consider how to enable shared automated mobility (SAM).<sup>76</sup> SAM

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<sup>73</sup> Richard Sobel, *The Right to Travel and Privacy: Intersecting Fundamental Freedoms*, 30 J. MARSHALL J. INFO. TECH. & PRIVACY L. 639 (2014); G.A. Res. 57/227 (Feb. 26, 2003).

<sup>74</sup> Innovation Gaps Transport, IEA, <https://www.iea.org/reports/innovation-gaps/transport> (last visited Oct. 4, 2022).

<sup>75</sup> Cong Zhang, *Understanding the Effects of Automated Vehicles on Commuter's Acceptance of Commute Time* (May 2021) (M.A. thesis, Pennsylvania State University) [https://etda.libraries.psu.edu/files/final\\_submissions/23758](https://etda.libraries.psu.edu/files/final_submissions/23758); Eric Hannon, *An Integrated Perspective on the Future of Mobility*, MCKINSEY SUSTAINABILITY (Oct. 10, 2016), <https://www.mckinsey.com/capabilities/sustainability/our-insights/an-integrated-perspective-on-the-future-of-mobility>.

<sup>76</sup> Tyler Duvall, Eric Hannon, Jared Katseff, Ben Safran, & Tyler Wallace, *A New Look at Autonomous-Vehicle Infrastructure*, MCKINSEY & CO. (May 22, 2019),

encompasses automation pilot programs, hybrid driving (which is when the road is shared by automated and human-driven vehicles), and full automation.<sup>77</sup> However, SAM often excludes non-car road users, particularly those with systemic barriers to transportation. This leaves communities with poor access to transportation at risk of being forgotten and further marginalized. For example, SAM prioritizes eliminating the need to park because vehicles will be able to pick up users even without an operator and, consequently, spaces that would otherwise be used for parking structures can be used for housing and commercial purposes. Gentrification is a serious risk when transforming spaces currently used for parking, among other infrastructure changes that will come along with the next transportation revolution.<sup>78</sup> Automation has the potential to not only make transportation inaccessible to low-income communities by increasing the cost of ownership, but to also increase the cost of living in the same people's neighborhoods by replacing parking structures with expensive housing or trendy recreation spaces.<sup>79</sup> Diversity in engineering and urban planning must be prioritized to meaningfully incorporate the societal impact of transportation technologies into SAM frameworks.

Transportation technology, however, is not inherently bad for nonusers within the community. Automation and electrification have the amazing potential to make public transportation and sidewalks safer and more efficient. Electrification, engine technologies, and transmission technologies in particular are beneficial for nonusers living in communities experiencing environmental injustice because the transportation sector contributes over half of the nitrogen oxides emissions in the United States.<sup>80</sup> Because environmental injustice and inaccessible health care are the most prevalent in the same

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<https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/a-new-look-at-autonomous-vehicle-infrastructure>.

<sup>77</sup> *Id.*

<sup>78</sup> Patrick Clark, *Self-Driving Cars Will Unlock Buildable Spaces, Reshape Housing Market*, TORONTO STAR (Oct. 17, 2017), <https://www.thestar.com/business/2017/10/17/self-driving-cars-will-unlock-buildable-space-reshape-housing-market.html>.

<sup>79</sup> *Id.*

<sup>80</sup> U.S. Environmental Protection Agency, *Overview of Air Pollution from Transportation* (2021).

communities, electrification contributes to the public health of the nonuser community.<sup>81</sup> Additionally, sidewalk safety may be improved by reimagining city infrastructure at the same time as automation technology (not to mention the fact that over 90% of traffic accidents are caused by human error so automation statistically makes pedestrians and bicyclists naturally safer).<sup>82</sup> In addition to safety, automation promises efficiency through connectivity and predictability, which are effects that will be felt by nonusers or users of public transportation as well.<sup>83</sup> Lastly, transportation technology lends itself to the universal basic mobility (UBM) pilot programs that are being tested across the United States. Much like universal basic income, UBM programs try to gauge the impact of having a secure minimum level of access to transportation on outcomes in employment, health care, and education for folks who have previously had little to no access.<sup>84</sup> Because UBM programs do little to address the vital role that personally owned cars play in American mobility, transportation technologies, which may make many American communities less car-centric, can further promote transportation equity in meaningful ways. Nonusers can benefit from UBM programs more robustly when car ownership is not all but mandatory in most of the United States.

### VIII. CONCLUSION

This article has provided a framework to explain the relationship of transportation technology, access to transportation, and forced labor, however, it is far from exhaustive. The impacts of automation and electrification on raw material mining, transportation workers, transportation users, and the greater community will be broad and

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<sup>81</sup> WORLD HEALTH ORG. REG'L OFFICE FOR EUR., ENVIRONMENT AND HEALTH RISKS: A REVIEW OF THE INFLUENCE AND EFFECTS OF SOCIAL INEQUALITIES, (2010).

<sup>82</sup> Sidewalk Labs, SIDEWALKLABS.COM, <https://www.sidewalklabs.com>; Julian De Freitas, Andrea Censi, Bryant Walker Smith, Luigi Di Lillo, Sam E. Anthony, & Emilio Frazzoli, *From Driverless Dilemmas to More Practical Common Sense Tests for Automated Vehicles*, 118 PNAS (2021).

<sup>83</sup> *Id.*

<sup>84</sup> Laura Bliss, *Like Basic Income, But for Transportation*, BLOOMBERG, (Nov. 11, 2020), <https://www.bloomberg.com/news/articles/2021-11-11/u-s-cities-test-effects-of-universal-basic-mobility> (last visited Oct. 4, 2022).

will require an interdisciplinary analysis. This article seeks to open the door for more robust conversations to include in the subsequent conference. The best practices and recommendations identified by the interdisciplinary panelists and participants will inform the subsequent report, which will be intended for state legislatures to better regulate transportation technology in a way that provides better access to transportation and, by extension, allows marginalized communities to regain control of their mobility. Said differently, this article is only the first of three parts to this study. This is a call to respond to this publication; tell me what is missing, what I did not portray correctly, and whose voice must be included. This article is a summary of the research that has been conducted to better contextualize the question, however, to begin to answer the question we need the engagement of experts with a variety of experiences so we can facilitate a conversation that figures out where those experiences overlap (or leave gaps).