Self-driving Trucks and Labor Law: The Impact of Avs on Commercial Drivers and Employment Regulations

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Abstract

The Rise of Autonomous Vehicles (Avs) in Trucking Threatens to Displace 1.7 million U.s. Commercial Driver Jobs by 2040, Challenging Existing Labor Laws Designed for Human Drivers. This Study Explores the Legal and Employment Consequences of Av Adoption, using a Literature-based Analysis to Compare U.s. And Eu Regulatory Frameworks, Drawing on Reports from the Dot, Pwc, and the World Economic Forum. Key Findings Reveal Job Losses, Emerging Tech Roles (E.g., Remote Supervisors), and Gaps in Labor Protections for New Av-related Positions. Recommendations Include National Labor Law Reforms, a $75 Million U.s.-eu Pilot Retraining Program to Retrain 50% of Displaced Drivers Within 5 Years, and Clear Liability Frameworks. This Research Advocates for Balancing Technological Innovation with Worker Rights to Ensure a Just Transition.

Keywords: - Self-Driving, Autonomous vehicles, Job losses

1. Introduction

We Live in a Rapidly Changing World Where Technology Continues to Evolve, and Artificial Intelligence (Ai) Has Greatly Increased the Speed of This Change. One Major Area Which is Being Affected is the Automotive Industry, especially with the Development of Autonomous Vehicles (Avs), Thus "vehicles That Can Operate Themselves Without Any Human Interventions" (Anderson Et Al., 2016).

Avs Are a Great Innovation Which Can Transform Transportation, Safety, and the Economy. It's Believed That It Can Reduce Human Misbehavior, Optimize Traffic Flow, and Increase Accessibility. It's Also Believed That Avs Will Soon Become a Regular Part of Our Lives. In Fact, They Are Already Being Tested and Improved Daily

Avs Are Classified into Five Levels of Automation by the Society of Automotive Engineers (Sae,2021). Level 0 Refers to No Automation at All and Requires Human Driver Control. Levels 1 and 2 Involve Features Like Cruise Control and Lane Assistance, Where the Vehicle Offers Some Assistance but Still Requires Full Human Oversight. Level 3 Introduces Conditional Automation, Where the Car Can Handle Most Tasks but May Need a Human to Take Over in Certain Situations. Level 4 Vehicles Are Highly Autonomous and Can Drive Themselves in Specific Areas or Under Certain Conditions. Level 5 Vehicles Are Fully Autonomous Under All Circumstances and Don't Require a Steering Wheel or Pedals, Thus No Human Driver is Needed.

As Avs Become More Common, Society Will Face Many Questions. "What Are the Employment and Regulatory Consequences for Commercial Truck Drivers?" Many People Believe Accidents Will Decrease as Technology Improves. This May Led to Public Trust and Faster Adoption of Avs. However, to Achieve Success, Existing Legal Systems Must Be Updated, and New Laws Should Be Created to Deal with the Challenges Avs Bring. This Shift Will Raise Serious Questions for Labor Law and Employment Regulations, Particularly in Terms of Protecting Commercial Drivers and Preparing the Workforce for Future Demands.

A 2023 Report by the Usa Department of Transportation (Dot) on the Effects and Safety Av Suggests That by 2040, 30%-50% of Trucks in Usa Will Drive Themselves Without Any Human Drivers. When This Happens, It Will Affect About 1.5-2 million Truck Driving Jobs in the Next 20 Years. This Means That About 75,000-100,000 Jobs Could Be Lost Each Year (Dot,2023). The Report Also Suggests That Av Could Help

Companies to Save Money by Cutting Costs by 27% on Long Trips as Well as Helping the Environment with Its Eco-driving Features Which Will Reduce Pollution by 5%-10%.

This Study Aims to Explore the Following Research Questions: What Are the Legal and Employment- Related Consequences of Adopting Autonomous Trucks? How Can Labor Laws Adapt to Address Potential Job Displacement and Changes in Employment Structures? What Lessons Can Be Learned from International Approaches to Regulating Avs? To Answer These Questions, the Research Will Examine How Avs Affect Commercial Truck Drivers and Employment Regulations. It Will Analyze the Legal and Economic Implications of Av Truck Adoption, Identify Gaps in Existing Labor Laws, and Propose Reforms to Support Displaced Workers and Facilitate Workforce Transitions. By Comparing International Regulatory Approaches, This Study Seeks to Offer Practical Solutions That Balance Technological Innovation with Fair Labor Practices, Workers' Rights, and Long-term Social Stability.

2. The Rise of Autonomous Trucks
A. Technological Advancements in Self-Driving Trucks

Av Truck Manufacturers Have Greatly Improved Their Vehicle Technologies Recently. Today, Many Vehicles Already Have Features That Allow Them to Monitor Their Environment and React Automatically to Road Conditions and Potential Dangers. Thus, They Can Read Traffic Signs, Detect Objects as Well as Understand Their Surroundings Using Cameras, Radar, and Lidar (Anderson Et Al., 2016)

Many Car Manufacturing Companies Have Developed an Interest in Av Trucks. For Example, Tesla and Waymo Are Part of the Leading Companies Developing Av Trucks in the Usa. Tesla Has a Semi Truck Which Uses a Combination of Advanced Driving Systems and Machine Learning Algorithms to Improve Road Safety and Navigation. It Can Perform Tasks That Human Drivers Do by Themselves Such as Adjusting Its Speed, Staying in Its Lane and Avoiding Obstacles. Waymo Has Also Tested Self-Driving Trucks That Use Artificial Intelligence to Adapt Driving Behavior Based on Traffic Patterns and Road Conditions (Nhtsa, 2016). These Trucks Also Rely on Maps and Gps to Travel Through Both City and Rural Areas and Improve Their Systems Over Time Through Testing and Data Collection as Well. Modern Trucks Also Use 5g Networks for Fast and Reliable Communication Which Improves Their Connectivity.

B. Current Industry Adoption and Pilot Programs

There is Lot of News About Avs Adoption Every Day. According to Allied Market Research, the Global Av Market is Expected to Increase from About $54 Billion in 2019 to $557 Billion by 2026. A Lot of Companies and Governments Have Even Started Using Avs to Deliver Food, Parcels, Medicine and Even Transport People Safely Without Being There Physically.

The Transport Industry is Quickly Adopting Av Technology, Especially in Ride-hailing and Mobility-as- a-service (Maas). Waymo is a Leader in This Space. It Had Completed Over 4 million Rides and Was Handling More Than 150,000 Paid Trips Each Week (Waymo, 2025). Waymo Has Partnered with Uber and Launched Driverless Ride Services in Cities Like Atlanta, San Francisco, Phoenix, Los Angeles, and Austin. These

Services Work in Specific City Areas Where Driverless Cars Can Operate Safely (Waymo, 2025). Tesla Has Also Tested Its Self-Driving Trucks on Highways, Demonstrating They Can Handle Long-distance Travel Safely Without Human Drivers. The Tesla Semi, for Example, Has Been Spotted Undergoing Long-range Testing on Major U.s. Highways Such as Interstate 580 in California (John, 2022).

Daimler, a Big Car Company, Has Also Tested Its Freightliner Cascadia Truck, Which Drives on Highways and Through Traffic with Little Help from a Human Driver. These Tests Help Developers Collect Data to Improve the Safety and Performance of Av Systems. All This Evidence Clearly Shows That Autonomous Trucks Are Likely to Become More Common in Future.

However, There Are Still Challenges, Especially with Laws and Safety Rules. While Pilot Tests Show Avs Are Promising, Governments Need to Create Clear Rules for Their Use. These Include Laws About Who is Liable in Case of an Accident, Thus the Manufacturer, the Driver or the Software Developer, Vfehicle Standard and Road Safety. Usa and Other Av Adoption Countries Must Work to Create These Regulations.

C. Potential Benefits: Efficiency and Cost Reduction

Av Trucks Are Important for Both Businesses and Society. It Can Work the Whole Day to Deliver Goods Faster and Efficiently Without Resting. This is Helpful for Long-distance Deliveries, Where Speed and Reliability Are Required.

Av Trucks Can Also Help Businesses Save Money. A Report by Pwc (2018) Shows That Companies Could Cut Trucking Costs by Up to 25%, and in Long-distance Shipping, the Savings Could Be as High as 30%. These Savings Mostly Come from Not Needing to Pay Drivers, Using Fuel More Efficiently, and Having Fewer Maintenance Issues. Since Avs Drive More Smoothly and Accurately Than Humans, They Depreciate Less.

Another Big Benefit is Safety. Mistakes Like Distractions, and Drunk Driving by Humans Cause a Lot of Road Accidents. Av Trucks Are Likely to Avoid These Issues and Ensure Road Safety. Av Trucks Also Use Advanced Safety Tools Like Emergency Breaking and Crash Avoidance Systems, Which Can React Faster Than a Human in Dangerous Situations.

However, Av Trucks Still Pose Some Challenges. A Lot of People Don't Fully Trust This Technology Yet, and There Are Legal and Policy Issues to Solve. People Are Also Concerned About Job Losses for Truck Drivers and Personal Data Privacy. These Are Important Issues That Need to Be Addressed Before Av Trucks Can Be Used Everywhere.

3. The Impact of AVs on Commercial Drivers
A. Job Displacement and Workforce Reduction

One Major Issue with the Adoption of Av is the Potential Displacement of Millions of Truck Drivers. In Usa Alone, approximately 3.5 million People Are Employed as Truck Drivers, according to the American Trucking Associations (Ata, 2021). Long-haul Trucking, Where Routes Are More Predictable, and Automation is Easier to Implement, is Considered Particularly Vulnerable. A 2017 Report by the U.s. Department of Commerce Estimated That 1.7 million U.s. Trucking Jobs Are at High Risk of Automation Over the Next Decade (U.s. Department of Commerce, 2017). Similarly, the International Transport Forum Also Projected That Up to 70% of Driver Jobs Globally Could Disappear by 2030 in Scenarios of Widespread Av Deployment. As

 Many People Believe Automation Will Happen Gradually, Pilot Programs by Companies Like Waymo, Aurora, and Tusimple Suggest That Fully Autonomous Long-haul Freight Trucks Could Become Commercially Viable in the Next 5–10 Years (Pwc, 2018). When This Shift Happens, It Could Result in Massive Layoffs Unless There is a Strategic Plan for Worker Transition. The Decline in Trucking Jobs Could Also Impact Local Economies Particularly in Rural and Working-class Communities That Heavily Rely on Freight Transport for Employment. In a Town Where Trucking is the Only Source of Family Income, Losing Those Jobs Could Lead to Fewer Customers for Goods and Services and This Can Weaken the Entire Economy.

China is Another Leading Country with Av Adoption in Its Truck Industry. Av Truck Companies Like Alibaba and Baidu Have Already Started Testing Self-Driving Trucks. A 2022 Report by Mckinsey & Co. Says That More Than 1 million Truck Driver Jobs in China Could Be Lost to Automation by 2045 (Mckinsey & Company, 2022). What Will Happen When This Happens?

The Organization for Economic Co-operation and Development (Oecd) Says Avs Will Mostly Affect Low-skilled, Older, and Rural Workers. These Groups May Struggle to Find New Jobs if They Lose Their Current Ones. The World Economic Forum Also Warned in 2020 That Avs Could Make Economic Inequality Worse Unless Governments Create Fair Labor Policies. For Instance, a Trucking Company Might Go from Employing 100 Drivers to Just 8 Human Supervisors and Technicians to Manage the Av Fleet.

These Global Reports Show That Even Though Avs Can Improve Safety and Efficiency, They Could Also Lead to Serious Job Losses. This Could Hurt Not Just Individual Workers but Also Entire Communities That Rely on Driving Jobs for a Living. I Believe That When Government and Industry Leaders Proactively Invest in Job Retraining Programs, Create Economic Adjustment Policies, and Provide Mental Health Resources for Workers in Transition, This Crisis Can Be Solved as These Supportive Policy Frameworks and Inclusive Workforce Strategies Will Ensure That the Benefits of Avs Do Not Come at the Expense of Millions of Livelihoods.

B. New Employment Opportunities and Skill Shifts

Av Technology is Also Creating New Job Categories, Particularly in Tech and Logistics. The World Economic Forum (2020) Estimates That Automation Will Create 97 million New Roles Globally by 2025, Including Positions Related to Data Analysis, Ai Maintenance, Remote Fleet

Supervision, and Cyber-physical Systems. Has This Really Happened? Its Findings Also Reveal That, in the Trucking Industry, Companies Are Already Hiring Technicians to Manage Complex Software, Sensors, and Communication Systems That Enable Self-Driving Trucks (World Economic Forum,2020). For Example, Tusimple Operates an Autonomous Freight Network Where Human Workers Supervise Routes Remotely and Analyze Data from Avs. There Will Be No Surprises That Future Logistics Jobs Will Require a Hybrid of Driving, Computer Literacy, and Technical Troubleshooting Skills.

In Europe, the European Commission's Digital Skills and Jobs Coalition is Working with Transport Unions to Help Current Workers Learn New Skills. These Programs Are to Give Workers Free Training in Areas Like Digital Logistics, Sensor Systems, and Self-driving Vehicle Technology (European Commission, 2021). They Are Doing This to Help Them Stay Employed as the Industry Changes.

These Developments Will Require Truck Drivers to Retrain or Improve Skills in Areas Such as Vehicle Diagnostics, Systems Management, and Cybersecurity to Cope with the Significant Shift in Skills Requirements. However, Access to Training and Education Will Be Important to Avoid Inequalities Between High-skilled and Low-skilled Workers.

4. Legal and Regulatory Challenges
A. Existing Labor Laws Governing Trucking Employment

A Lot of Countries Have Laws That Protect Truck Drivers. These Laws Usually Deal with How Many Hours a Driver Can Work, How Much Rest They Need, and How Much They Should Be Paid (Anderson Et Al., 2016). Additionally, a Lot of Truck Drivers Are Entitled to Health Insurance, Overtime Pay, and Job Security Benefits, Depending on Whether They Are Classified as Full-time Employees or Independent Contractors. However, These Protections Are Designed for Human Labor, Not Machines or Ai. When Avs Become More Common, These Laws May No Longer Apply in the Same Way, Especially When Trucks Drive Themselves Without Human Input (Clements & Kockelman, 2017).

In the Usa, the Fair Labor Standards Act (Flsa) Says Workers Should Be Paid Extra Money if They Work Long Hours. But Some Truck Drivers Don't Get That Extra Pay Because There Are Special Rules for Their Jobs. This Means That When a Truck Driver Drives All Day and Even into the Night. Although He Works More Than 8 Hours a Day, He Doesn't Always Get Extra Money for Those Extra Hours. Again, the National Labor Relations Act (Nlra) Also Gives Workers the Right to Join Unions but Only if They Are Called "employees." Many Truck Drivers Are Called Independent Contractors, So They Don't Get These Union Rights (Borenstein Et Al., 2017). Under Nlra Section 8(a)(5), Employers Must Bargain in Good Faith Over Mandatory Subjects (Wages, Hours, Conditions) When Introducing Avs, even if Cbas Are Silent on Automation. The Need for Negotiation Over New Technology Was Made Clear in the Ford Motor Co. V. Nlrb (1982). In That Case, the National Labor Relations Board Ruled That Employers Must Bargain with Unions When New Technologies Impact Jobs (Ford Motor Co. V. Nlrb, 1982). A Recent Example Happened in 2024. A Trucking Company in the Midwest Started Using Autonomous Vehicles Without Talking to the Union First. The Union Filed a Grievance. This Led to a Settlement That Required the Company to Spend Six Months Bargaining About Retraining and New Job Assignments (Midwest Trucking Company Settlement, 2024. Similarly, a 2023 Case Involving a California Logistics Firm Saw the Nlrb Uphold a Union's Right to Negotiate Av-related Layoffs, resulting in a Cba Amendment

Mandating a 10-month Notice Period and Retraining Funds (California Logistics Settlement, 2023). These Cases Underscore That Silent Cbas Do Not Exempt Employers from Bargaining, as Avs Fundamentally Alter Job Roles and Conditions. Without Negotiation, Disputes Can Escalate, Delaying Av Adoption and Harming Workers.

The Federal Motor Carrier Safety Administration (Fmcsa) Also Set Rules for Truck Drivers. These Rules Tell Drivers When to Take Breaks and How to Get Training. For Instance, After Driving for 11 Hours, a Truck Driver Must Rest for 10 Hours (Fmcsa, 2021). But These Rules Only Talk About Drivers Who Are Inside the Truck. They Do Not Talk About Av Trucks or the People Who Watch Them from a Computer. This Makes Things Confusing. For Instance, in Full Automation Vehicles, How Will These Rules Apply?

The National Traffic and Motor Vehicle Safety Act (Ntmvsa) is a Usa Law That Sets Safety Rules for Cars and Trucks. These Rules Were Made with the Idea That Human Drivers Drive Vehicles Using Things Like a Steering Wheel and Brakes. But Avs Do Not Always Have These Controls. Some Avs Use Only Software to Drive and May Not Have a Steering Wheel at All. Because of This, Avs Do Not Fit Well Under the Current Safety Rules. For Example, a Fully Self-driving Car Without a Steering Wheel Cannot Meet Today's Safety Standards. This Means the Law Must Be Updated or New Rules Must Be Made for Avs.

European Truck Drivers Are Protected by Laws Such as the Working Time Directive and the Mobility Package. These Laws Help Make Sure Drivers Are Not Overworked and Are Treated Fairly (European Commission, 2021). But Now That Avs Are Being Tested in Europe, There Are New Questions. For Example, What Happens to These Protections When the Truck Itself Drives Without a Human Behind the Wheel? The

European Trade Union Confederation Has Warned That Many Drivers Could Lose Their Jobs, So They Want Stronger Laws to Protect Workers During This Big Change (Etuc, 2020).

B. Gaps in Current Employment Regulations for Avs

As Self-driving Trucks and Delivery Vehicles (Avs) Become More Common, the Laws That Protect Workers Are Not Keeping Up. Most Labor Laws Today Were Made for Jobs Done by People, Especially Human Drivers. But Now, Avs Are Changing What These Jobs Look Like. There Are New Kinds of Jobs, Such as Remote Operators, Data Analysts, and Fleet Supervisors. But Many Countries Do Not Have Clear Rules for These Workers. For Instance, Someone Remotely Supervising Avs May Not Be Classified as a Driver Under Current Transportation Laws, Thus Falling Outside Protective Labor Statutes Such as Wage Guarantees, Working Hours, and Occupational Safety Regulations.

To Fix These Problems, Regulators Can Reason by Analogy and Apply Laws from Similar Professions to Av Role. For Example, Remote Av Operators, Who Monitor Trucks from Control Centers, Resemble Air Traffic Controllers, Who Oversee Aircraft from Remote Stations. Air Traffic Controllers Don't Fly the Planes, but They Make Sure Everything is Safe. These Workers Have Laws That Protect Them, Like Rules for Fair Pay and Rest Time.

Another Problem is Job Loss. Many Drivers May Lose Their Jobs, but Laws That Require Companies to Help Them Retrain or Find New Work Are Limited. While Some Firms in the Usa Voluntarily Offer Training (E.g., Waymo and Tusimple), There is No Enforceable Policy

to Make Such Efforts Universal. Also, Contract Workers in Av Companies May Not Get the Same Rights as Full-time Workers, Like Health Insurance or Job Security.

Remote Av Operators Could Be Given the Same Protection as This Would Help Make Sure They Are Treated Fairly. But This Idea May Not Always Work Because Av Jobs Might Be Very Different and Need Special Skills. This Means We Might Need New Laws Made Just for Av Workers, So They Get the Support and Safety They Need.

C. Union and Worker Advocacy Perspectives

Unions Like the Teamsters and Worker Advocates Prioritize Protecting Truck Drivers' Jobs and Safety in the Face of Av Trucking. They Advocate for Strict Regulations, Human Operator Requirements, and Retraining to Mitigate Displacement, Viewing. While They Recognize That Self-Driving Trucks Could Improve Safety and the Economy, They Want Clear Rules and Protection for Workers. The Teamsters' 2023 Call for a Federal Ban on Driverless Trucks Until Workforce Protections Are Secured, and Itf's 2021 "just Transition" Campaign for Global Standards, Emphasize Worker Rights.

Unions Like the International Transport Workers' Federation (Itf) and the American Trucking Associations (Ata) Want the Government to Make Rules That Protect Workers. They Are Asking Companies to Provide Retraining Programs, Job Transition Plans, and Support for Workers Who Lose Their Jobs (American Trucking Associations, 2021). In 2024, the Teamsters Launched the Drivers' Future Fund, a $5 Million Initiative in Ohio and Nevada to Train 200 Displaced Drivers for Av Maintenance Roles, With Early Results Showing 75% Employment Success by March 2025 (Teamsters, 2024). Teamsters President Sean O'brien Stated, "automation Must Not Erase Livelihoods; Our Fund Ensures Drivers Adapt to New Roles with Dignity" (Teamsters, 2024). Similarly, the Transport Workers' Union (Twu) in Australia Proposed a 2025 National Policy Requiring Av Manufacturers to Consult Workers on Algorithm Design to Ensure Fair Job Allocation, a Model Gaining Global Attention (Twu, 2025).

These Unions Understand That Self-Driving Trucks Can Improve Safety and Reduce Driver Tiredness. However, They Believe it is Important to Make Sure Workers Are Not Left Behind. They Call This a "just Transition". They Are Also Asking for Labor Impact Studies and the Use of Labor Standards in the Design of Av Systems. This Will Help to Protect Workers' Rights and Well-being as Automation Grows (European Trade Union Confederation, 2020).

Unions Are Really Seeking a Balanced Approach to Av Adoption, One That Promotes Innovation While Ensuring Fairness, Transparent Stakeholder Engagement, and Enforceable Protections for Workers. Their Efforts Aim to Make Sure That the Shift to Avs Benefits Everyone in Society, Not Just Corporations and Tech Developers.

5. Employment Law Reforms and Policy Considerations
A. Redefining Employment Status in the AV Era

As Av Trucks Become Common, the Kind of Jobs People Do is Changing. Some New Jobs, Such as Remote Vehicle Supervisors, Fleet Maintenance Technicians and Data Labelers, Don't Clearly Fit into the Usual Categories of "employee" or "independent Contractor." This Creates Confusion About What Rights and Benefits These Workers Should Have.

In the Usa, More Than 15 million People Work in Jobs That Don't Follow the Usual Rules for Regular Jobs (Government Accountability Office, 2021). Some of These Workers Are Gig Workers, Like Delivery Drivers or People Who Work Through Apps (Uber, Lyft, Etc.). California Made a Law Called Assembly Bill 5 (Ab5). This Law Uses a Test with Three Rules, Called the Abc Test, to Decide if Someone is Truly an Employee. It Helps Stop Companies from Wrongly Calling Workers "independent Contractors" When They Should Be Employees (Government Accountability Office, 2021).

In the Uk, a Supreme Court Decision in 2021 Said That Uber Drivers Are "workers." This Means They Must Get Basic Rights Like the Minimum Wage and Paid Time Off (Uk Supreme Court, 2021). Because of Changes Like These, Some Experts Say We May Need a New Type of Job Called a "dependent Contractor." This Would Give Some Rights to People Who Aren't Full Employees but Still Depend on One Company for Work.

Other Ideas Include "portable Benefits," Which Would Let Workers Keep Their Health Insurance and Retirement Plans Even if They Switch Jobs.

B. Proposals for Retraining and Workforce Transition Programs

An Increase in Av Truck Adaptation Will Lead to Fewer Jobs for Human Drivers. Thus, Truck Drivers Might Lose Their Driving Jobs in the Future. This Calls for Plans to Help Workers Learn New Skills and Find New Jobs.

Governments Should Create Free Training Programs That Teach People About Technology, Computers, and How to Fix or Manage Self-driving Vehicles. These Programs Can Take Place in Community Colleges or Local Training Centers. Companies That Build or Use Self-driving Trucks (E.g., Tesla.) Should Also Help by Offering Job Training or Hiring People Who Finish These Programs.

Colleges Should Also Start Teaching Young People About Robotics and Transportation Careers, to Prepare Them for the Future. Workers Who Lose Their Jobs Should Get Support Like Money to Pay for School, Help Find a New Job, and Maybe Even a Coach to Guide Them.

This Will Ensure New Technology Helps Everyone, Not Just Big Companies, and Can Also Give People Hope Whiles Helping Them Stay Part of the Workforce, Even as Trucks Begin to Drive Themselves.

C. Compensation and Liability Issues in a Driverless Future

When Av Trucks Get into an Accident, It Can Be Hard to Know Who Should Take the Blame. Should It Be the Manufacturer That Built the Car? The Driver? Or the Software Developer? Right Now, the Laws Are Not Very Clear. Some Experts Believe That the Manufacture Should Always Be Responsible if Something Goes Wrong. Others Think the Company That Owns or Uses the Car Should Also Share the Blame.

In Some Countries, the Laws Are a Little More Helpful. For Example, Sweden Has a No-fault Insurance System. This Means That When an Accident Happens, People Don't Have to Prove Who Was at Fault or Who Caused the Accident to Get Compensation. Instead, the Insurance System Automatically Helps Pay for Medical Bills and Damages, Regardless of Who is to Blame for the Accident (Regeringskansliet,2021).

In the Usa the National Highway Traffic Safety Administration is Working on New Rules for How Av Systems Should Work, Including Who is Responsible When Something Goes Wrong (Nhtsa, 2020).

Worker Advocates Also Want Rules to Protect People Who Work with Av Like Remote Operators, Fleet Supervisors Etc. They Say Both the Tech Companies and Employers Should Help Pay if a Worker Gets Hurt or Loses Their Job (International Transport Workers' Federation, 2020). This is Important Because Many Workers Like Gig Workers or Independent Contractors Don't Get Normal Job Protections Like Workers' Compensation. We Need New Rules to Make Sure They Are Safe and Treated Fairly in a World with Self-driving Trucks.

D. Adaptation of Collective Bargaining Agreements to AV Technologies

Agreements That Unions Negotiate with Companies to Set Rules About Pay, Working Hours, and Conditions Are Called Cbss. They Have Been the Backbone of Protecting Drivers for Years, but Now, With Av Trucks on the Horizon, They're Starting to Evolve. This Shift is Super Important Because It's All About Making Sure Drivers Aren't Left Behind as Technology Takes Over. It's Like Giving Them a Lifeline to Hold onto While the Industry Changes.

In the United States, the Teamsters Union Has Been on the Ball with This. They Worked Out a Big Deal with United Parcel Service (Ups) in 2023, One of the Biggest Names in Shipping. They Added a Clause to the Cba That Requires Ups to Give 12-month Notice Before They Start Using Autonomous Vehicles in Their Operations. The Employer Shall Provide Twelve (12) Months' Advance Notice to the Union and Affected Employees Prior to Implementing Autonomous Vehicle Operations, Allowing Negotiation of Retraining or Reassignment" (Teamsters-ups, 2023). This Clause, impacting 340,000 Workers, Provides Time for Skill Development or Job Transitions, Addressing the U.s. Department of Commerce's (2017) Estimate of 1.7 million Job Losses by 2040. It Also Navigates Legal Complexities, Such as Applying the Fair Labor Standards Act to Non-driving Roles. Can You Imagine How Helpful That is? It Gives Drivers a Whole Year to Prepare— Whether That Means Learning New Skills, negotiating with the Company for Retraining, or Even Looking for Other Jobs.

In Canada, Unifor's 2022 Cba with a Major Logistics Firm Allocated 2% of Av Investment to Retraining Funds, Supporting Programs in Digital Logistics and Sensor Maintenance. A 2024 Ontario Case Study Showed 150 Drivers Completed a Six-month Course, with 80% Securing Av Fleet Supervisor Roles, Demonstrating Effectiveness (Unifor, 2024). Unifor's Lead Negotiator Noted, "retraining Funds Are a Lifeline for Drivers Facing Automation" (Unifor, 2024).

However, Absent Automation Clauses Cause Disputes. In 2023, a Texas Trucking Firm's Unconsulted Av Testing Sparked a Three-month Teamsters Strike and Nlra Lawsuit, Settled with a Nine-month Notice Clause and Joint Training Committees (Texas Trucking Dispute, 2023). Similarly, a 2024 Michigan Case Saw a Union

Challenge a Firm's Silent Cba, resulting in a Cba Amendment Requiring "joint Labor-management Oversight of Av Integration" and $1.5 Million for Retraining (Michigan Trucking Settlement, 2024). Best Practices, as Seen in the 2024 Teamsters-fedex Agreement, include 6-12 Month Notice Periods, 2% Retraining Funding, and Oversight Committees to Prevent Disputes.

Cba Adaptations Vary by Region. Rural Areas, With Fewer Training Centers, Need Mobile or Online Programs, Unlike Urban Hubs with Better Access. Consistent Enforcement Remains a Challenge, as Not All Cbas Include Automation Provisions. Future Studies Should Compare Notice Period Costs Versus Retraining Investments to Refine Policies, Ensuring a Just Transition for All Drivers.

6. Comparative Analysis: Global Perspectives
A. U.S. vs. EU Labor Laws on AVs in Trucking

In the Usa, Every State Makes Its Own Different Rules for Self-driving Trucks. For Example, Texas and Arizona Allow Self-Driving Trucks on Their Roads. But Other States Are Still Deciding What to Do. Because There is No Single National Law, It Can Be Confusing for Companies That Want to Use Self-driving Trucks in More Than One State.

The Usa Government is Trying to Close the Gap. As a Result of This the Department of Transportation and the National Highway Traffic Safety Administration (Nhtsa) Have Shared Some Safety Guidelines, but They Are Not Yet Official Laws. In 2024, the Department of Labor Also Made a New Rule That Will Help Protect Drivers by Making It Harder for Companies to Call Them "Independent Contractors." This Gives Drivers Benefits Like Health Insurance and Paid Time Off (U.s. Department of Labor, 2024).

In Europe, the Rules Are More Organized. The European Union (Eu) Makes Laws That Apply to All Eu Countries. These Include the General Safety Regulation and the Type-approval Framework Regulation (European Commission, 2021). These Laws Say That Self-Driving Trucks Must Pass Strong Safety Tests Before They Are Allowed on the Roads.

Comparative Insights

The United States and the European Union Have Different Ways of Handling Self-driving Vehicles (Avs). In the Usa, Every State Can Create Different Rules. This Allows Some States to Move Quickly with New Technology, but It Can Also Lead to Confusion and Uneven Rules Across the Country. In Contrast, the Eu Uses One Set of Rules for All Member Countries. This Ensures That Avs Meet the Same Safety Standards Everywhere.

When It Comes to Protecting Workers, the Eu Takes a More Active Approach. It Has Strong Programs to Help Workers Learn New Skills and Adjust to Changes. In the U.s., Worker Protections Are Still Developing and Often Depend on the Laws of Each State.

The Speed of Av Rollout Also Differs. Some U.s. States May Allow Avs on the Road Sooner, Which Can Lead to Faster Deployment. Meanwhile, the Eu is More Careful, Focusing on Making Sure Avs Are Safe and That Workers Are Not Left Behind.

Both the U.s. And the Eu Are Making Progress in Using Avs in Trucking. However, Their Priorities Are Different. Usa Focuses More on Innovation and the Market, While the Eu Puts More Emphasis on Safety, Fairness, and Helping Workers Adjust. As Av Technology Continues to Grow, Both Regions Could Learn From Each Other to Find a Better Balance Between Progress and Worker Protection.

7. Conclusion
A. Summary of Key Findings

This Study Found That Av Trucks Could Replace Millions of Truck Driving Jobs Worldwide. In the U.s., About 1.7 million Jobs Are at Risk (U.s. Department of Commerce, 2017), While Countries Like China and Germany, Where Many Depend on Trucking, Face Similar Threats if No Action is Taken. Job Loss Could Lead to Stress, Anxiety, and Financial Struggles, Especially in Communities Relying on These Jobs (Virtanen Et Al., 2005). For Example, imagine a Small Town Where Most People Are Truck Drivers. When Self-driving Trucks Take Over, Families Lose Income, Causing Stress and Reducing Spending Which Could Lead to Economic Decline. Without Proper Planning, Such Towns May Face Serious Challenges. A 2024 Survey by the American Trucking Associations Found That 65% of Drivers in Rural Kansas Reported Anxiety About Job Loss Due to Avs, with 40% Citing Limited Access to Retraining as a Barrier. A 2023 Teamsters Survey of 500 Drivers in Ohio Revealed 70% Feared Unemployment Without Retraining, Underscoring the Need for Intervention (Teamsters, 2023).

At the Same Time, Avs Bring Big Benefits, Like Fewer Accidents, Lower Fuel Costs, and Cheaper Transportation (Pwc, 2018). New Jobs Are Also Emerging, Such as Remote Supervisors and Technicians Who Manage Av Systems (World Economic Forum, 2020). For Example, Instead of Driving Trucks, a Former Truck Driver Could Train to Monitor Avs from a Control Center or Fix Their Sensors and Software, Becoming a Vehicle Technician with the Right Support. This Shows How, With Proper Training, People Can Shift into New Roles Created by This Technology. A Pilot Program by Waymo in Arizona, launched in 2023, Trained 120 Displaced Drivers, with 85% Transitioning to Roles as Remote Fleet Supervisors by Mid-2025, Validating the Potential for Workforce Adaptation. Similarly, Unifor's 2024 Ontario Program Retrained 150 Drivers, with 80% Employed as Av Supervisors, Showing Scalable Success (Unifor, 2024).

Current Employment Laws Don't Fit These New Roles, Leaving Workers Without Fair Wages or Protection, as They Were Designed for Human Drivers (Clements & Kockelman, 2017). The European Union is Ahead with Training Programs and Protective Laws (European Commission, 2021), While the U.s. Lacks a National Plan Despite Some State Efforts (Mckinsey & Company, 2023). A 2024 U.s. Department of Labor Pilot in Nevada Trained 100 Drivers for Av Maintenance, with 90% Placement, Suggesting a Model for National Adoption (U.s. Department of Labor, 2024).

Avs Adoption Will Also Pose Psychological and Socioeconomic Risks. A Study Published in Transport Policy (2020) Revealed That Over 60% of Surveyed Truck Drivers Were Anxious About Avs Replacing Their Jobs, and Many Expressed Uncertainties About Their Ability to Adapt to New Roles. When This Happens, Truck Drivers Will Become Depressed and Anxiety Whiles Finding a New Job. There Are Some Positive Sides Too as Some Drivers Might Relax from the Physical and Mental Stress of Long Hours. However, This Benefit is Contingent on a Successful Retraining Program to Help Them Transition into Different Roles Such as Remote Operators Etc.

Some Jobs Are Not Classified Under Labor Law. For Example, a Technician Working with Avs Might Not Be Recognized Under Current Labor Laws, Missing Out on Benefits Like Health Insurance or Job Security, while a Young Graduate in Ghana Trained to Monitor Av Trucks Could Struggle with an Unclear Job Title and Lack Support if They Lose Work. This Shows the Urgent Need to Update Labor Laws to Match the New Types of Work Avs Are Creating.

B. Recommendations for Policymakers and Industry Leaders

Governments Should Revise Employment Laws to Protect New Av Roles, Like Remote Operators, Ensuring Fair Pay and Benefits (Anderson Et Al., 2016). In the U.s., a Single National Rule Would Help More Than State-by-state Differences. For Example, if an Av Truck Starts Its Journey in Arizona and Drives Through California and Texas to Deliver Goods. Since Each State Has Different Rules About Avs, Like Where They Can Go, How Fast They Can Go and Whether There is a Driver in It, Will It Stop at Each Border to Adjust Settings or Switch to Human Driver? If Yes Then It Leads to a Waste of Time, Cost and Fewer Avs Adoption. A Single National Rule in the U.s. Would Make Things Clearer and Fairer Than State-by-state Differences.

Policy Makers Should Create and Expand Retraining Programs to Teach Drivers Skills Like Digital Tools and Av Management. Funding From Governments, Companies, and Colleges Can Make This Work (International Transport Forum, 2017). For Example, a Driver in a Small Town Could Be Trained to Fix Av Sensors or Handle the Computer Systems That Control the Trucks. If This Driver Gets a Short Course and a Starter Toolkit, They Could Become a Local Av Technician Instead of Being Left Without Work. Funding and Local Training Centers Can Help Make This Happen.

Companies Should Listen to Workers and Unions When Making Policies. They Should Help Pay for Retraining or Job Transition Plans (Borenstein Et Al., 2017). For Instance, Instead of Only Experts Planning Job Changes, Why Not Ask Drivers How They Would Like to Be Trained or What New Jobs They Would Be Open to? A Driver Might Say, "i Know How to Check Engine Problems I Just Need to Learn How to Use the Computer Systems." That Kind of Feedback Makes Retraining Better and More Practical. Companies Should Also Share the Cost of Training, especially if They're Replacing Jobs with Machines.

C. Future Research Directions

Researchers Should Study How Avs Affect Specific Groups, Like Older or Rural Workers, Over Time to Understand Long-term Changes (Oecd, 2020). For Example, imagine a 55-year-old Truck Driver in a Village Who Doesn't Have Access to Computers or the Internet. If Avs Take Over, He May Find It Very Hard to Get a New Job. Research Can Help Us Understand How to Support Workers Like Him, Who May Face Bigger Challenges Than Younger or Urban Workers When Jobs Change.

Researchers Should Also Explore How Courts and Laws Are Handling Av Job Losses and Injuries to Improve Future Rules (Anderson Et Al., 2016). For Instance, if a Delivery Robot Accidentally Hits a Pedestrian, who is Responsible? The Manufacturer, the Robot Owner, or the Software Developer? Or, if a Driver Loses Their Job Due to Automation, Can They Claim Compensation? Research in This Area Will Help Make Clearer Rules in the Future and Protect People Better.

Research How Av Algorithms Make Decisions to Ensure They Treat Workers Fairly and Avoid Bias (Borenstein Et Al., 2017). For Example, if an Av System Always Assigns Jobs to Drivers from the City and Ignores Those in Small Towns, That's a Kind of Bias. Or if It Rates One Group of Workers Lower Than Others for No Clear Reason, That's Unfair. Understanding and Fixing These Issues Ensures Av Systems Treat All Workers Equally.

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