

Transportation Industry Outlook

The transportation industry must navigate a confluence of opportunities and challenges—a driver shortage, regulatory pressures, innovative disruptions, and changing marketplaces—to capitalize on the current freight market.

RUAN

FEBRUARY 2021



TRANSPORTATION INDUSTRY OUTLOOK

ECONOMIC IMPACT

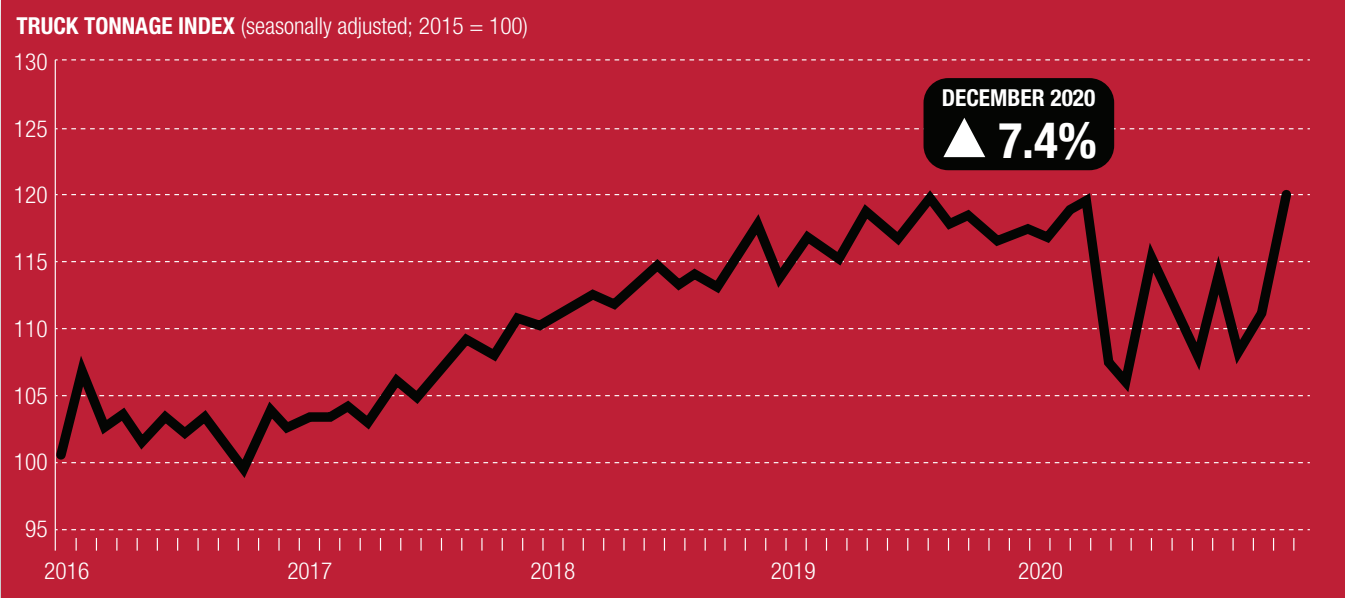
The transportation industry is vitally important to the global and American economy. According to the American Trucking Associations (ATA), overall freight tonnage will grow more than 25 percent by 2030 to 20.6 billion tons—with revenues increasing 53.8 percent to \$1.6 trillion. Trucking will remain the dominant freight mode, hauling 68.8 percent of the total freight tonnage in 2030.

Despite its importance, trucking is not immune to ups and downs of economic pressures or, as we saw beginning in 2020, global pandemics. In early 2020, some economists agreed that the transportation industry was stabilizing after softened demand in 2019 and nearing supply/demand equilibrium. Then came COVID-19, derailing any and all predictions economists had about the American economy and different sectors within it. Compounded by a presidential election and civil unrest, 2020 was filled with uncertainty.

Demand for freight skyrocketed in several verticals in spring as Americans endured stay-at-home orders due to COVID-19, including food, beverage, medical supplies, and e-commerce. Others like metals, services, travel and tourism, manufacturing, and automotive saw stark declines as the economy and production essentially shut down. Many of these industries are still stalled as we enter 2021.

Without demand for freight in the second quarter of 2020, carriers parked trucks and some were forced to reduce their workforces—just like businesses in almost every industry. The economy faced a record-setting decline in the second quarter of 2020, where real GDP decreased 31.4 percent. But in the third quarter, after efforts to reopen businesses and resume activities, GDP increased at an annual rate of 33.4 percent, and transportation demand slowly increased. The economy then grew by 4 percent in the fourth quarter as consumer confidence continued to slowly rebound after bottoming out in May. Many factors are at play that make projecting 2021 demand and growth estimates difficult—the recent surge of COVID-19 cases, the vaccine rollout, and uncertainty about Biden’s presidency and a Democrat-controlled Congress.

While the transportation industry will feel the impact of COVID-19 for months to come, overall freight tonnage in the long-term should continue to increase with the U.S. population and slowly growing economy. As a result, more drivers and trucks could be necessary to move all the goods required by the American public. In addition to economic factors and spiking COVID-19 cases, transportation companies and their shipper partners will contend with a growing and changing driver shortage, regulatory pressures, and disruptors upending the industry, all of which demand decisive action to remain successful.



TRANSPORTATION INDUSTRY OUTLOOK

DRIVER SHORTAGE

The U.S. professional truck driver shortage is currently estimated at around 60,000. That's 60,000 trucks sitting empty, unable to haul available freight in the current market where demand is fairly high. Industry wide, many older drivers retired early in the pandemic, and others have had difficulty renewing or getting new commercial driver's licenses (CDL) due to closures of state motor vehicle offices and training facilities. Moreover, thousands of drivers have been disqualified from driving since the Federal Motor Carrier Safety Administration's (FMCSA) Drug and Alcohol Clearinghouse launched in January 2020. Estimates indicate there are 40,000 fewer truckload drivers than there were a year ago, according to *Fleet Owner*. Unless there is a significant downturn in the economy in the long run, the American Trucking Associations suggests that the industry could be short just over 100,000 drivers in five years and 160,000 drivers in 2028.

Several underlying factors contribute to the truck driver shortage, including intense competition within the industry and from other industries; driver qualifications and requirements; trucking regulations that tighten capacity; costly time delays at shipper locations and along America's deteriorating infrastructure; an older workforce continues to retire—the average trucker is 57 years old; and difficulty attracting young people to the industry since one cannot acquire a commercial driver's license until age 21. For younger generations, trucking is perceived to be labor intensive with low pay and poor hours that do not allow for work-life balance. To fill these seats with qualified, safe drivers, the industry and individual carriers must make some changes to driving positions.

An ATA workforce development committee was formed to work with federal and state officials to find solutions to these issues. The committee is encouraging the development of robust apprenticeship programs to

engage workers before they can officially qualify for an interstate CDL at 21. Outreach to veterans and historically underrepresented communities like women—who currently make up only 7 percent of the commercial driving workforce—will be critical as well. Congress has been presented bills that would reduce the minimum age for an interstate CDL to 18 years, and the Federal Motor Carrier Safety Administration has accepted comments on whether it should propose a pilot program allowing under-21 drivers to operate heavy-duty trucks interstate. The ATA and other state trucking associations are also actively engaged in a public relations campaign to position truck drivers as safe, family-oriented professionals who play a critical role in our nation's economy and the lives of every consumer.

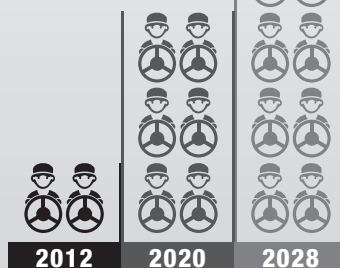
In addition to these larger industry initiatives, many carriers are increasing pay, moving to hourly pay, offering sign-on, transition, and performance bonuses, creating predictable work schedules, and allowing more home time to attract and retain drivers. These pay raises are in addition to the 13 percent increase experienced over the past two years. In 2019, driver wages and benefits topped carriers' cost-per-mile spending for the fourth consecutive year, according to data released in November 2020 by the American Transportation Research Institute (ATRI). Carrier costs on the whole declined to \$1.65 a mile in 2019, a

9 percent decrease from 2018, due to a contraction in demand for freight after record levels were set in 2018. However, spending on driver wages and benefits still accounted for 69.3 cents per mile, or 42 percent of carriers' average marginal cost.

Shippers can help driver recruitment and retention efforts as well, particularly by reducing detention time when a truck arrives to load or unload. Ultimately, carriers must adapt the job of truck driver to be more appealing to a new generation of younger drivers rather than trying to fit new drivers into the older generation model of trucking.

DRIVER SHORTAGE FORECAST

Each driver icon represents a shortage of 10,000 drivers.



TRANSPORTATION INDUSTRY OUTLOOK

TRUCKING RATES AND DEMAND

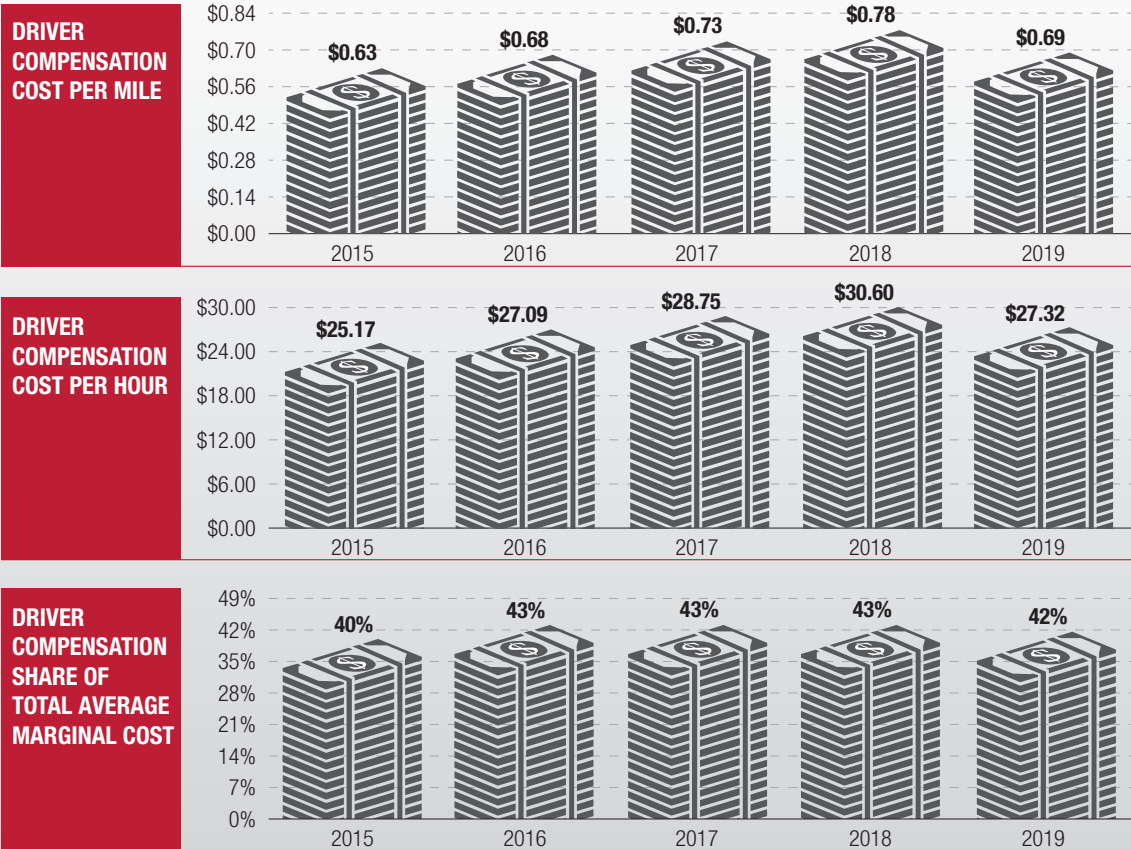
Generally, as carriers offer their drivers higher pay and bonuses, they must also secure rate increases from customers, both in contractual relationships and in the spot market. Rates increased to all-time highs in 2018 then stabilized in 2019 amid a slower growing economy and excess capacity.

Rates in 2020 were not immune to the impact of COVID-19. The Cass truckload index, which tracks contract rates minus fuel surcharges, saw rates fall in each of the first four months of 2020 at the fastest pace in a decade. Once the economy reopened, those contract rates continued to raise the index through the rest of 2020, and Cass anticipates the index will increase over the coming quarters as carrier-shipper contract rates are renegotiated to reflect high demand and lower supply. Contract rate increases could be in the high-single to low-double-digit range, according to *Freight Waves*, but those increases could slow when consumers begin to spend more on travel and services after largely purchasing only goods throughout the pandemic.

In April 2020, spot market rates sunk to their lowest level in three years before beginning to recover in May. Spot rates saw unprecedented gains through the second half of 2020, and that trend is likely to continue for months to come. In fact, according to DAT Solutions, van spot market load rates in December 2020 were up almost 27 percent compared with a year ago.

Experts predict trucking demand to increase through 2021 as the economy recovers and capacity remains tight due to regulatory pressures and the driver shortage. FTR Transportation Intelligence forecasts truck loadings to increase more than 5 percent in 2021 after suffering a 4 percent decline in 2020. FTR also anticipates that spot and contract rates will increase 10 percent on aggregate through 2021. And as the vaccine allows suffering sectors—like services and manufacturing—to rebound, that will only mean more freight for the industry.

The tables below show the results of ATRI's 2020 "Analysis of the Operational Costs of Trucking" report referenced on the last page.



TRANSPORTATION INDUSTRY OUTLOOK

REGULATIONS

Trucking is highly regulated, and several new and pending regulations will continue to impact the industry, especially as we enter into a new presidential administration and Democrat-controlled Congress. On Inauguration Day, President Joe Biden signed an executive order (for all industries) to freeze all regulatory activity—any Trump administration measure that had not been published on the Federal Register was stalled. Among those affected by the executive order include the U.S. Department of Labor’s January 6 final rule clarifying the standard for employee versus independent contractor status under the Fair Labor Standards Act, an issue that has long impacted trucking. The industry will also watch how Biden’s Department of Transportation, led by former Indiana mayor Pete Buttigieg, will handle two pilot programs initiated under the Trump administration: the hours-of-service (HOS) Split Duty Period Pilot Program to pause the 14-hour clock, as well as an under-21 military CDL pilot program.

In addition to assessing Trump’s midnight regulations, Biden’s DOT may give consideration to new regulatory initiatives, including mandating truck speed limiters, developing Compliance, Safety, Accountability (CSA) safety fitness ratings, creating sleep apnea criteria for drivers, and determining whether driver detention time should be regulated. Trucking may also be impacted by Biden’s environmental and sustainability regulations and any infrastructure plans.

The following regulations are and have been significant to trucking over the past few years, and they will continue to impact the industry going forward.

Hours-of-Service Flexibility

On September 29, 2020, new hours-of-service rules that govern when and for how long professional truck drivers may work went into effect. The federal HOS rules were last updated in 2013, and the industry had sought flexibility that would allow truck drivers to make driving decisions based on fatigue, weather, congestion, etc. The four 2020 rule changes were met with praise by the industry.

First, the 30-minute break rule, which requires a break after no more than eight hours of consecutive driving, can

now be satisfied by the on-duty/not driving status, rather than off-duty status. Therefore, drivers can use fueling time or waiting to load/unload as the 30-minute break.

Second, drivers are now allowed to split their required 10 hours off duty into two periods: an 8/2 split, or a 7/3 split, with neither period counting against the driver’s 14-hour driving window. Under the previous rules, drivers had to be off-duty or in a sleeper berth for 10 consecutive hours before driving again after completing a 14-hour workday.

Third, FMCSA modified the adverse driving conditions exception by extending the maximum window during which driving is permitted by two hours. The rule allows the workday to be extended to as much as 16 hours in the case of adverse conditions such as extreme weather or congestion.

Fourth, the agency changed the short-haul exemption that is available to certain commercial drivers by lengthening the driver’s maximum on-duty period from 12 to 14 hours and extending the distance limit within which the driver may operate from 100 air miles to 150 air miles.

FMCSA evaluated more than 8,000 comments from industry stakeholders regarding the changes and sought to balance roadway safety with much-needed driver flexibility in the final rule. There is speculation that the Biden administration may seek to roll back some of the 2020 changes or propose additional HOS rules.

National Drug and Alcohol Clearinghouse

Carriers are now required to report drivers’ positive test results and refusals to test into a central Drug and Alcohol Clearinghouse. Employers must also access this database when looking to hire potential drivers—and to query the database annually for current drivers. The clearinghouse became operational on January 6, 2020. Mandatory use went into effect at that time, though FMCSA extended by three years the date for state driver’s licensing agencies to comply fully with certain clearinghouse requirements. The extension allows FMCSA time to complete its work on a forthcoming rulemaking to address the states’ use of driver-specific information from the clearinghouse, as well as develop the technology platform through which states will electronically request and receive clearinghouse information.

TRANSPORTATION INDUSTRY OUTLOOK

The clearinghouse has caused capacity to tighten and worsen the driver shortage because truck drivers are no longer be able to hide positive drug and alcohol tests from potential employers. According to *Fleet Owner*, the Drug and Alcohol Clearinghouse has already culled more than 40,000 commercial drivers from the industry who have either failed tests or quit before testing knowing they would fail. Only a little more than 10 percent of disqualified drivers are currently going through the return-to-duty process. The clearinghouse may also be a barrier to entry for those considering a career as a professional driver.

According to the FMCSA, marijuana far outpaces other types of drugs detected by tests reported to the clearinghouse. As more and more states legalize recreational marijuana use—which federal rules strictly prohibit for CDL holders—a standardized clearinghouse will continue to ensure visibility across the industry and remove impaired and unsafe drivers from their seats. The industry must now, however, find a way to fill those seats with qualified drivers.

Electronic Logging Device Mandate

Electronic logging devices (ELD) are mandated for heavy-duty trucks with of goal of ensuring regulatory hours-of-service compliance and promoting safety. The mandate requires carriers to record drivers' HOS data with ELDs instead of paper logbooks, which are more susceptible to errors or falsification. Since the initiation of the ELD mandate, the number of hours-of-service violations in the industry has dropped quite significantly. According to the FMCSA, roadside driver inspections with hours-of-service violations have dropped by more than 50 percent since the mandate went into effect in December 2017. And of all the roadside inspections completed, less than 1.25 percent of them resulted in a driver being cited for not using the appropriate method to record HOS, including not having an ELD when required.

As for improving safety, critics of the mandate claim that being “on the clock” has forced drivers to drive beyond speed limits; speeding continues to be the most frequent driver inspection violation. At this point, the ELD mandate has not necessarily reduced highway deaths, but the increase in vehicles and miles traveled (at least before the COVID-19 pandemic thwarted travel in 2020) makes

it difficult to correlate the mandate with the increase or to claim that the mandate has failed to achieve its goal of making highways safer.

Entry-Level Driver Training Rule

The entry-level driver training (ELDT) final rule mandated certain minimum training requirements for those seeking to obtain a Class A or Class B commercial driver's license, or a hazardous materials, passenger, or school bus endorsement. The rule was set to go into effect in February 2020, but FMCSA delayed implementation by two years in December 2019. The final rule requires driver's license schools, as well as carriers with in-house CDL training programs, to self-certify in a Training Provider Registry and overhaul entry-level driver training courses to provide a curriculum that will be consistent across the country. Training providers wishing to provide ELDT will need to be listed on the Training Provider Registry, and drivers seeking a CDL or endorsement on or after that implementation date must complete the required training as set forth in the ELDT final rule.

According to *Commercial Carrier Journal*, the DOT currently only mandates four topics for CDL training providers: hours-of-service rules, driver qualification and disqualification, health and wellness, and whistleblower protection. The new rule will require schools and trainers to provide 31 specific theory courses as well as 19 behind-the-wheel (BTW) skills courses. Driver candidates will be required to have an 80 percent pass rate in theory courses and the ability to demonstrate proficiency in all 19 BTW skills required in order to pass. The stricter training requirements should have a positive impact on highway safety, but there's also potential to slow down the labor pipeline in an industry desperate for drivers.

Meal and Rest Break Provisions

Even though the trucking industry is regulated by federal HOS rules, some states have issued their own regulations that are often in conflict with the federal rules. In these states, plaintiffs' attorneys have used state regulation of trucking companies as the basis of expensive lawsuits related to meal and rest breaks and pay types. And many courts have sided with the states, especially in California.

In a major industry triumph, the FMCSA granted a petition by the American Trucking Associations to block

TRANSPORTATION INDUSTRY OUTLOOK

California's rules in December 2018 in an effort to ensure consistent rules and promote safety. The ATA turned to the FMCSA after Congress failed for four years to restore the strength of the Federal Aviation Administration Authorization Act of 1994 (F4A)—the regulation that broadly preempted states from regulating interstate motor carriers. In May 2019, another industry victory came when a California court dismissed a driver's claims regarding the state's meal and rest break provisions, saying it does not have the authority to review the merits of the case. However, there will continue to be many more challenges to the FMCSA's ruling as this is a hot button issue. The Biden administration will likely look closely at this issue in the coming months.

Compliance, Safety, Accountability Overhaul

Compliance, Safety, Accountability is the FMCSA's carrier scoring program designed to improve safety by identifying at-risk drivers. FMCSA conducts inspections and reviews crash reports and then measures the results using the Safety Measurement System (SMS). Each month, SMS measures a carrier's previous two years of violations and crash data to calculate a score in seven safety behavior areas called BASICS: unsafe driving, hours-of-service compliance, driver fitness, controlled substances and alcohol, vehicle maintenance, hazardous materials compliance, and crash indicator.

But the regulation has been under fire for a number of reasons since its inception in 2011—namely data quality, use of relative rankings between carriers, and enforcement and reporting inconsistencies between states. Congress ordered CSA scores to be removed from public view until a study could be conducted to identify issues, followed by the implementation of needed changes that better assess a carrier's safety performance. The National Academies of Science (NAS) completed the Congressionally mandated study on CSA in 2018 and recommended that the FMCSA rework CSA's Safety Measurement System and revise its underlying statistical model using Item Response Theory.

Following the NAS's recommendations, the FMCSA will also work to improve the quality of data used to score carriers; make it easier for carriers to understand and calculate their safety scores; and evaluate adding an absolute scoring system instead of relying only on relative

scores that hinge on a comparison to a carrier's peers, according to *Commercial Carrier Journal*. In addition, FMCSA is working to correct one of the chief criticisms of the program—the lack of accounting for crash responsibility in scores.

A Democrat-controlled Congress may return CSA scores to public view before the underlying scoring system changes are made, and additional changes could be suggested as well.

Combating Nuclear Verdicts

The past decade has seen a significant uptick in the number of nuclear verdicts, where victims of incidents with large trucks receive a jury award above \$10 million. In 2012 alone, five cases averaged a \$22.5 million payout. And a Florida jury handed down what is believed to be the biggest nuclear verdict ever against a single trucking company defendant: a \$411 million verdict to a motorcycle driver. Large jury awards of \$1 million and above are also on the rise. An American Transportation Research Institute study found a 335 percent rise in the number of cases with a jury award over \$1 million from 2012 to 2019.

Regardless of fault or the facts of the case, plaintiffs' attorneys often use emotional appeal to enrage jurors and force them to act with a sense of moral obligation. According to the American Trucking Associations, this tactic "compels the jury on a base level to render an outsized verdict in order to send a broader message that speaks to issues beyond the proximate cause of the particular accident under examination." These verdicts are generally awarded when incidents result in paralysis, brain damage, or death. In trial, plaintiffs' attorneys aim to prove that the carrier was negligent in some way, therefore resulting in the truck driver being involved in such an accident. While nuclear verdicts are rare, they garner much national media attention, tarnishing public perception of even the safest carriers.

The large payouts also pose a risk to the industry in the form of excess insurance rates—so far by as much as 10 percent as insurers try to cover and protect against such large losses. One reason plaintiffs' attorneys cite when requesting large payouts is to reflect real-world cost increases, according to *Freight Waves*. But ATRI's research found that from 2010 to 2018, the size of

TRANSPORTATION INDUSTRY OUTLOOK

verdict awards grew 51.7 percent annually, while standard inflation only grew 1.7 percent and health care costs grew 2.9 percent.

To combat nuclear verdicts, the industry, led by the American Trucking Associations, is calling for tort reform. The ATA is focusing its efforts on those reforms most important to the trucking industry, like elimination of joint and several liability, caps on punitive damages, the recognition of collateral sources, and the admissibility of non-use of seat belts—where defense lawyers are unable to present evidence that a victim was not wearing a seat belt, contributing to his or her injuries. The ATA also works closely with state trucking associations to ensure that trucking industry interests are included in state tort reform efforts.

DISRUPTORS

In addition to the driver shortage and regulations contributing to a capacity crunch, carriers are contending with a changing marketplace. The rapid growth of e-commerce has completely changed how, when, and for what price consumers want to receive their goods. Transportation companies must ensure that they help their customers meet the expectations of the final consumer of the products. That includes providing transparency and visibility to where a product is and when. COVID-19 precautions have shifted consumers to shopping online even more. In addition, carriers must attract new drivers to haul the freight in the first place—and younger generations have high technology expectations.

Many start-ups and tenured companies alike are creating everything from self-driving trucks to mobile technology systems that can wholly transform—or disrupt—the way business has been done in the past. They're revolutionizing ways that trucks operate and interact with the central office, as well as how shipments are booked, paid for, and tracked.

Mobile Technology

Workers and customers now expect their business interactions to function like their personal interactions. Like all workers in other industries, truck drivers—particularly young drivers the industry is desperately

trying to attract—are fluent in mobile tech use and expect high-functioning technology in the workplace. And shipper customers demand it. To remain competitive, trucking companies must adopt the latest mobile technologies, which can describe a system with mobile capabilities or that can push information to and from a mobile device.

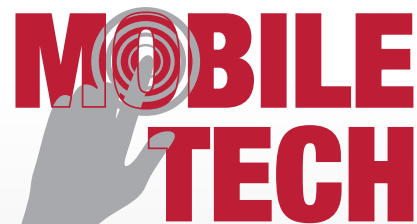
The ELD mandate helped carriers to adopt new technology. Many platforms that met the ELD mandate requirements are available on smart phones or tablets instead of the dash-mounted computers that some carriers adopted for logging and compliance prior to the mandate. For a population that's accustomed to the ease of use offered by mobile technology for personal needs, dash-mounted computers with chunky keyboards or touch screens that require large buttons or styluses are a hassle.

What's more, drivers and office workers are often tasked with completing jobs or entering data in multiple and separate apps and programs.

This context shifting is time consuming, inefficient, and frustrating. Modern mobile technology allows work to be completed within one unified, workflow-centric app that runs on common tablets and smart phones. The dynamic workflow capabilities within mobile technologies ensure that data is captured in a uniform way, enforcing consistent and common practices across the company. Plus, workflow and accurate data can eliminate major driver headaches—like delays from handling paperwork, inefficient scheduling, confusing procedures, and recording detention time, to name a few.

Autonomous Trucks

Innovations to trucks themselves have major potential to disrupt the trucking industry as we know it. Start-ups and the largest truck builders alike are investing billions of dollars to develop trucks capable of driving themselves



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TRANSPORTATION INDUSTRY OUTLOOK

down America’s freeways. A number of companies are already testing self-driving trucks with a safety driver in the cab.

Self-driving trucks could help companies reduce labor costs by extending the number of hours trucks are in operation and potentially cutting the number of drivers needed for interstate driving. Plus, some believe autonomous trucks have the potential to be safer—and could therefore reduce insurance premiums—because accidents are largely caused by human error. The industry agrees, however, that drivers will always be critical to navigate city streets for the first and last miles of trips. In fact, self-driving tech developers are positioning the technology as a partner to drivers rather than a job killer—productivity increases, and the job becomes more attractive to drivers. From exit to exit, drivers can perform other tasks, like ensuring data is captured accurately, while the truck runs on autopilot.

While the technology could soon be in place, the challenge is to get autonomous trucks on the road and making money. Several technical and regulatory hurdles to that future currently exist, but a growing number of trucks are already equipped with advanced driver assistance systems that could step in with alerts or autonomous braking and other controls when drivers are slow to react.

Electric Trucks

One of a trucking company’s largest—and often most volatile—operating expenses is fuel, so Tesla’s 2017 announcement about the launch of its electrically powered tractor-trailer could be a game changer. Many other truck manufacturers have entered the electric truck arena as well. A number of major carriers have already reserved Tesla semis, which cost \$150,000 for a model with a 300-mile range per charge and \$180,000 with a 500-mile range. Most diesel-powered tractors cost around \$125,000, but Tesla predicts that the electric vehicle will pay for itself within two years thanks to savings in aerodynamics, reliability,

and fuel. The vehicle boasts additional safety features, including wrap around windshields, cameras



instead of rearview mirrors, and autonomous systems like automatic emergency braking, automatic lane keeping, and forward collision warning, according to Tesla. The widespread adoption of electric trucks will depend on how they perform in real-world situations, the availability of battery recharging facilities, and the training of workers to service electric vehicles.

Driver Monitoring

One way the industry is moving to combat accidents is through the use of driver monitoring tools. Electronic logging devices are a type of monitoring system, as they track and report speed, location, and driving status, not to mention where drivers stand within federal hours-of-service requirements. Trucks now widely come equipped with advanced driver assistance systems that use a combination of radar- and camera-based components, like following distance alerts and active braking, that could intercede on the driver’s behalf to eliminate or greatly decrease a collision’s severity. Any event triggered by the technology is reported to employers.

But more intrusive technologies are also being developed. Ball caps are being developed to measure brainwaves and give a fatigue rating, a critical factor for drivers as many accidents are caused in one way or another by the effects of fatigue. One company is developing a vest that could detect a driver’s heart attack and stop the truck as a result. More common, road- and driver-facing dashboard cameras are used to record actions that can negatively affect safety. Some driver-facing cameras even monitor drivers’ eyelids for signs of fatigue. Onboard video event recorder systems link into a truck’s engine to record video clips before and after exception-based events such as speeding, forward collision warnings, hard braking, lane departure alerts, and collisions. Those videos may then be accessed for driver coaching or for litigation in the case of an accident. As nuclear verdicts become more prevalent, cameras can provide proof of what happened in an incident rather than depending on witness testimony.

Drivers, who already feel closely monitored by regulators, employers, and their customers (who are demanding real-time data on loads to appease their own customers) are often bothered by the use of these additional monitoring technologies because their trucks serve as their offices—

TRANSPORTATION INDUSTRY OUTLOOK

and homes for over-the-road drivers. Others like the idea of working for companies that value providing drivers the resources to stay safe and improve their skills. If the technology can help prevent accidents, provide coaching opportunities after near-misses, and save carriers money, more carriers will likely conclude that the intrusion is warranted.

Robotic Process Automation and Artificial Intelligence

Several technologies are currently helping to drive efficiencies and reduce human error in back offices. With the major influx of data sent and received on a daily and even hourly basis, it is difficult for employees to process, especially if they suffered a night of poor sleep, deal with frequent work interruptions, or are simply having a bad day. These real-life inconsistencies could have an impact on the consistency of work decisions that people make for their customers—which could cause increased costs or delivery delays. But artificial intelligence (AI) enabled software doesn't have inconsistencies—it works as it was programmed to work, reducing errors while handling thousands of business situations. As a result, transportation companies are relying more and more on AI solutions for repetitive administrative tasks, which allows employees to focus on value-added tasks, like analysis, coaching, and customer service.

One key automation technology is natural image processing. The technology recognizes and pulls relevant information from documents like invoices or rate requests, alleviating the time-consuming and error-prone task of manual data entry. Natural image processing reduces paperwork and allows back office staff to focus more on analysis and optimization.

Another significant AI capability is predictive analysis, where computers can find patterns and reach decisions that are outside of a human's capacity to process. Computers can take data from one source and analyze it in context with data from several other sources—which is something the human brain doesn't have power to process, nor do most employees have the time available to try. Predictive analysis is especially compelling from a safety standpoint. Carriers could harness data from in-cab technology—like collision mitigation systems, dash cameras, and ELDs—to create algorithms related

to safety, allowing them to determine which drivers are most likely to have a preventable accident or violation. The technology could also help support drivers currently on the road. For instance, if a driver has X number of lane departures in X minutes, an alert could be sent to the driver's mobile application to see if he or she is okay. Data, in this case, would provide an extra layer of support to professional drivers.

Predictive analysis also has applicability in fleet maintenance. As computers on wheels, trucks produce a multitude of data. That data, if analyzed correctly, can be used to predict and then prevent breakdowns by notifying maintenance teams of necessary preventive maintenance before an issue arises. This technology could reduce downtime and potentially maintenance spend.

Augmented Reality

While augmented reality (AR) technology is still in the development phase, it holds significant opportunity for the transportation industry. AR, coupled with visual learning models, allows workers to perform simple tasks outside of their immediate areas of responsibility, reducing dependency. Consider a driver who breaks down on a highway. Using AR-enabled smart glasses and repair apps, the driver could assess and fix minor problems without a technician. Essentially, a less experienced person could complete a more sophisticated process by leveraging a wearable computer or mobile device.

In another application, heads-up displays can project relevant information on windshields, like driving speed, weather updates, and approaching road delays. The virtual instructions are superimposed on real objects as a driver travels down the road. AR could also help transform warehouse processes; some software is able to recognize serial and barcode numbers, identify objects, and also help employees navigate the warehousing floor to expedite the picking process. This technology could reduce training time and costs, and it's virtually error free.

Internet of Things and Sensors

The Internet of Things (IoT) refers to a connected network of physical devices and vehicles, among other things, that are equipped with software, sensors, and wireless connectivity—meaning they can be monitored and controlled via the internet. IHS Markit predicted that

TRANSPORTATION INDUSTRY OUTLOOK

the IoT will consist of 30.7 billion objects by 2020. In the world of trucking, these things include navigation systems, electronic logging devices, advanced driver assistance systems, and networks of Internet-enabled sensors that monitor everything from tire pressure and trailer temperature to fuel usage and maintenance needs. Sensors can be applied to trailers, pallets, and even trays, allowing for package-level visibility for operations managers and customers. And all of these things produce a vast amount of data that, if used properly, can help create fleet efficiencies and improve safety.

Each operation has contingency plans developed in case they need to work through a capacity issue or team member absences, including allowing our team members to work remotely. Increased communications, frequent data sharing, and constant monitoring are important elements of each plan if so needed.

As always, Ruan is focused on the safe execution of our customers' business.

THE YEAR AHEAD

Trucking companies face a host of challenges in the marketplace: the ongoing COVID-19 pandemic, workforce concerns, major regulatory pressures, economic uncertainty fueled by business shutdowns related to COVID-19, and a new presidential administration. But 2021 and beyond will see success for those able to navigate the driver shortage, industry regulations, innovative disruptions, and changing expectations of consumers.

RUAN RESPONSE TO COVID-19

Consistent with our Safety Focus and People First Guiding Principles, Ruan's business continuity team has been actively monitoring the COVID-19 situation since early 2020. This team is meeting weekly to respond to and proactively plan for the effects of the virus. Our primary focus is to provide teams with the tools needed to help protect our most valuable resource—our people.

At this time, Ruan is following recommendations from the Centers for Disease Control and Prevention (CDC). We have implemented a tiered, comprehensive Coronavirus Prevention and Preparedness communications plan, including written and verbal communications to team members regarding prevention and operational preparedness across the country. We are helping our 300+ operations across the country navigate the COVID-19 vaccine; we do not plan to mandate vaccination, but our team members are strongly encouraged to receive it for their personal health and those around them.