

CONNECTIVITY:

How Advanced Vehicle Technology is
Changing the Transportation Industry

The pace of change that has taken place over the last 20 years has been greater than that of any other time in human history. This change is being felt in every industry – from medicine and retail to food and beverage to supply chain and transportation logistics.

Driven by technology advancements, computational power, and more digitally savvy people – customers and businesses – the requirements placed on a more connected world are greater than ever. Gartner predicts that by the end of 2025, there will be over 15 billion connected devices in use worldwide. That is a 31 percent jump year over year.

Connectivity is driving the transportation industry to deliver advanced vehicle technologies that include everything from in-cab systems to engine and trailer diagnostics to next-generation fuels and autonomy.

Because of this, the next five to 10 years in the transportation industry is going to be pivotal and exciting. At no point in the history of the industry has there been this level of technology in trucks. Assets are now beginning to communicate with each other and with infrastructure, giving valuable information to drivers, fleet managers, technicians, city planners, and compliance officials.

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The result is not just connected vehicles, but connected cities and networks that improve efficiency, business intelligence, service levels, and revenue streams for companies.

Companies need to start preparing for these changes now, and use them as a competitive advantage. This report explains many of the new technologies entering the industry today, and how business owners can prepare for the future of the transportation industry.



The Truck of the Future, Today

Fleet technology and innovation is being driven by both regulatory mandates and the need for greater visibility and efficiency. The heart of truck connectivity is the telematics system that monitors location, speed, hours of service, and data that drives predictive analytics for companies.

From an electronic logging device (ELD) standpoint, the telematics system provides compliance to the new ELD Mandate. It's the basic building block for the connected vehicle. Beyond telematics, several other advanced technology devices are available that improve driver safety and fleet efficiency. These include video monitoring systems, automated manual transmissions, and roll stability control.

Vehicles can also be equipped with forward looking radar and collision mitigation systems that give vehicles the ability to greatly reduce the severity of, or even avoid an accident when road conditions suddenly change. Additionally, lane departure systems provide much needed information where blind spots may exist on a commercial vehicle. The combination of these devices are essential in driving safety for all drivers and passengers on the roads.

For the future state of the industry, this new technology and resulting connectivity is the basis for advanced fuel systems such as electric and hydrogen powered vehicles, as well as autonomous vehicles. Just as these pioneering vehicles offer enticing environmental and economic benefits, they also promote the integration of connectivity through additional monitoring of subsystems like the engine or trailer.



Benefits of Advanced Vehicle Technology

Connected trucks have the ability to provide a plethora of data, but it doesn't translate into business intelligence and key predictive analytics unless you have the right people utilizing it. The data provided through these new, innovative devices can be used to determine the condition of the vehicle, where goods are, how to manage exceptions, and develop new business strategies.

On a basic level, the data can tell fleet managers location information in real time, what speed the vehicle is traveling, and how long a vehicle has been in a specific position. Fleet managers can also determine if drivers are accelerating erratically or making abrupt stops. This data is key to understanding how efficiently the asset is being used. The fact of the matter is, a vehicle's purpose is to distribute goods. If it isn't moving, it is not achieving its purpose. Therefore, fleet managers want to know when it's not being utilized, or even when the engine is idle.

Connectivity extends much beyond the total vehicle to some of the subsystems such as the engine and trailers. Engines today are increasingly complex, and the connected technology allows drivers and fleet managers to know the operating condition of the engine no matter where the vehicle is.

This includes fault code elements that trigger check engine lights or service indicators. Because of connectivity, data, and analytics, these fault codes can alert fleet managers and drivers to operating conditions that could lead to a breakdown or out of service event, which could cause major downtime for the vehicle.

There are additional elements, which may be critical as well. For example, in the food and beverage industry, the Food Safety Modernization Act has changed the standards when it comes to refrigeration systems and transporting foods. The new standards require extremely clear cold chain tracking and accountability. While these new mandates don't require a telematics system, it has become an industry best practice to use one. The connectivity allows fleet managers and their customers to monitor the temperature of the vehicle where the goods are being stored, and ensures they are within the approved range for the product. This gives proof of clear custody and control of the product if questions surround the quality of it.



Who Else Benefits from Advanced Vehicle Technology

When it comes to connectivity, there are going to be multiple users of the data when you think about the fleet and supply chain universe. A company's clients can use certain elements of the data to know where their delivery is in real-time, how to schedule staff to receive and distribute the delivery, and to inform their customers about the availability of goods. This gives them better visibility of the goods they've ordered and makes the carrier an integral part in their value chain.

Service centers and technicians gain better visibility into the performance of the vehicle, the engine, and integrated systems. They can then plan for the maintenance activities dynamically because of the data.

Safety departments will have visibility to data they can use to tailor specific training for drivers and dispatchers. The procurement department will be able to better plan the best place to purchase and refuel the vehicles, based upon the routes the company is operating. This drives both cost and efficiency, by having the driver fuel at the most optimal location.

Additional stakeholders can be seen when moving to greater sharing of information at a much higher level. City planners can use it to look at traffic flows and continue to build connected cities. The advertising industry can use it to determine when and where to communicate best with a certain demographic, such as drivers, further tying buyers and sellers together.

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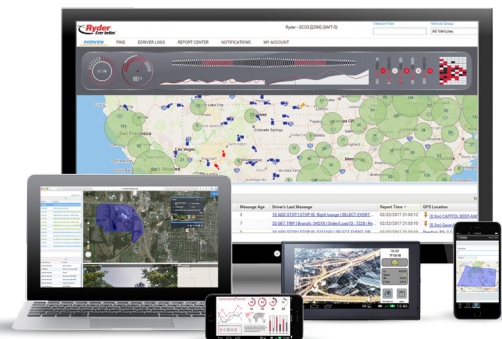
How Companies can Manage Innovation

Much like smart phones and computers, as new and innovative technology emerges, the transportation environment continues to see a push every two to three years for the next iteration of vehicle performance and efficiency. This is creating an environment where fleets are going from a steady state in their processes, and how they operate, to needing to be more flexible in trying to absorb how these technologies fit in their operations.

There are so many different areas of need and opportunities when it comes to technology and innovation that a company's fleet strategy comes down to how it aligns with the core values of the business. For example, if a company is more focused on manufacturing a certain product and that's where their core competencies are, their capabilities around vehicle maintenance or fleet planning and management may no longer align with their core strategy.

They would either need to look to investing in training, technology, and management, or outsourcing their fleet to a partner who has those capabilities. With the proliferation of advanced vehicle technology, leasing is a great tool to help mitigate risk of the unknowns around the new technologies that are being embedded in the vehicles. The complexity requires a very specialized skill set for drivers, technicians, and fleet managers that may not be as easy to scale. Many companies are already finding it difficult to bridge that gap.

However, leasing a fleet creates an environment that minimizes the exposure to the unknowns around reliability, uptime, operating costs, and residual values that are changing dramatically in these cycles from generation to generation. These transitions are smooth and designed to mitigate risks for companies because lease providers, like Ryder, take on the burden of the transition.



The Power of Partnerships, Technology and Flexibility

At Ryder, we have one of the largest fleets in the industry, and are at the forefront of innovation. Through our experience and investment in advanced vehicle technologies, our customers benefit from a better fleet that no one else can offer because of the investment we have made and partnerships built.

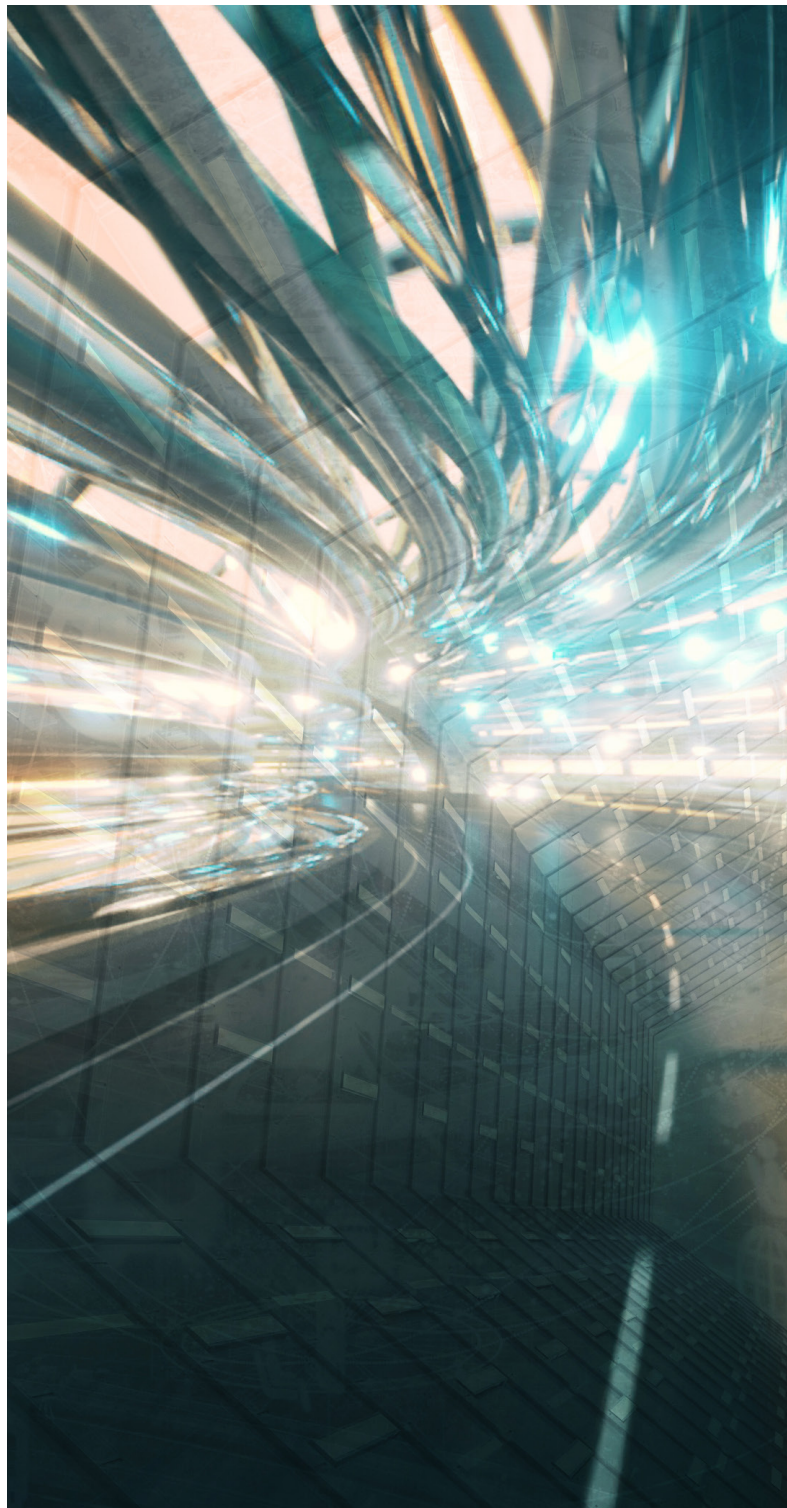
We are leveraging our relationships with Original Equipment Manufacturers (OEMs) to work with and understand how advanced vehicle technologies fit into your portfolio. This includes our RydeSmart telematics portfolio, in shop maintenance technology, and our exclusive partnership with Aperia to implement the Halo Tire Inflator – an automatic tire inflation solution. The relationships also ensure that integration is looked at through the lens of a fleet operator and not a truck manufacturer.

With our combination of know-how, relationships, and experience, we enable private fleet operators and companies to outsource their challenges to us in order to drive fleet efficiency and compliance.

We've bundled all this together in our Ryder ChoiceLease portfolio that provides the most flexible lease options in the industry, allowing you to choose technology that fits your business best, as well as the built-in maintenance level you prefer – Full Service, Preventive, or On-Demand. This not only gives you access to our advanced vehicle technology capabilities, but also to best-in-class maintenance capabilities at 800 service facilities in North America, performed by our 5,900 technicians who are trained in the latest vehicle technology.

With a Ryder ChoiceLease, you don't have to worry about the hassles of keeping up with the latest advanced vehicle technology – we do it for you. In turn, you get a reliable, connected, and modernized fleet that is customized to your business with a predictable monthly payment.

Discover how outsourcing with Ryder can improve your fleet management. Visit [ryder.com](https://www.ryder.com) or call **855-785-9870**.





About Ryder

Ryder is a FORTUNE 500® commercial fleet management, dedicated transportation, and supply chain solutions company. The Company offers nationwide access to over 800 state-of-the-art service facilities, 5,900 certified technicians, and a dedication to superior repair quality, safety, speed, and full visibility. Ryder offers a wide range of maintenance products for all vehicle types, delivering flexibility around the level of maintenance that companies require in order to keep their fleet running properly throughout its life span.

Ryder's stock (NYSE:R) is a component of the Dow Jones Transportation Average and the S&P MidCap 400® index. The Company has been named among FORTUNE's World's Most Admired Companies, and has been recognized for its industry-leading practices in third-party logistics, environmentally-friendly fleet and supply chain solutions, and world-class safety and security programs. Inbound Logistics magazine has included Ryder in its "Green Partners" listing for eight years in a row. Ryder was also recognized by the U.S. Environmental Protection Agency (EPA) with a 2014 SmartWay Affiliate Challenge award and SmartWay Excellence Awards in 2014 and 2013. Ryder is a charter member of the NGV Fleet Forum and a member of the Department of Energy's National Clean Fleets partnership. Ryder is also a recipient of the 2011 NGV Achievement Award.