ASSET 2.0
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AI Warp Speeds a Replacement for Lithium

Artificial intelligence has been getting a bad rap recently. Naysayers cite costly implementation, potential job loss and a general lack of humanity and creativity. On the flip side, AI proponents counter with increased opportunities for automation, personalization, innovation and efficiency. This article perfectly illustrates how AI can make scientific breakthroughs in a matter of months instead of years. Talk about innovation and efficiency at warp speed! *Page 5* ►

The Used Truck Market—What Every IR Pro Needs to Know

When you've got just one, or a whole fleet of used commercial trucks on your asset disposition list, you have a big-ticket item(s) that hopefully will bring top dollar. Used truck market trends are vulnerable to all kinds of economic drivers that can push prices up or down. This article provides IR professionals with a better understanding of the factors that impact this ever-evolving landscape of the trucking industry, and the current used truck market conditions for 2024—and beyond.

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PRESIDENT'S MESSAGE

LEVERAGING AI TECH FOR FLEET MANAGEMENT

In this issue, we take a deep dive into AI and trucks as they relate to IR and sustainability. So, I would like to take a 'deeper dive' into how AI can effectively manage a new and used vehicle fleet through enhanced decision-making processes. Here are some steps you can take and ways AI can assist you in managing your vehicle fleet and optimizing investments:

1. **Data Collection and Analysis:** Collect and analyze data related to vehicle performance, maintenance history, fuel efficiency, driver behavior and more. Implement IoT devices and vehicle sensors to gather real-time data for better insights.

2. **Predictive Maintenance:** Predict maintenance needs and identify potential issues before they occur, reducing downtime and maintenance costs.

3. **Optimizing Vehicle Lifecycle:** Analyze data to determine the best time to sell or retire a vehicle based on factors like depreciation, maintenance costs and market value.

4. **Route Optimization:** AI tools can help you plan the most efficient routes for your vehicles, reducing fuel consumption and improving overall fleet efficiency.

5. **Driver Behavior Monitoring:** Analyze driver behavior data to identify areas for improvement, such as excessive idling, harsh braking and speeding, leading to cost savings and improved safety.

6. **Insurance and Risk Management**: Analyze historical data to predict risk factors, optimize insurance coverage and reduce insurance costs for your fleet.

7. **Investment Recovery:** Optimize IR strategies by analyzing market trends, vehicle depreciation rates and resale values to identify the best time to sell or replace vehicles.

8. **Strategic Planning:** Generate insights and recommendations for future investments, such as whether to expand the fleet, invest in electric vehicles or adopt new technologies like autonomous vehicles.

9. **Cost Optimization:** Identify cost-saving opportunities across your fleet operations, such as reducing fuel consumption, optimizing maintenance schedules and improving overall efficiency.

10. **Continuous Learning and Improvement:** Implement a feedback loop to continuously learn from data and feedback, allowing for ongoing improvements in fleet management strategies.

Implementing these steps and leveraging AI technologies can help you effectively manage your vehicle fleet, optimize investments, and stay competitive in the ever-evolving automotive industry.

Want to learn more about AI? Sam Richter will be the featured keynote speaker at the Fall Conference in Tempe, AZ, September 22-25, 2024. He has created hundreds of AI programs people around the world use every day. See you there!

—Dave Williams
Georgia Transmission

COVER STORY

AI WARP SPEEDS A REPLACEMENT FOR LITHIUM

Dunkin' Donuts, that icon of American brands, has had great success with their slogan, "The world runs on Dunkin'!" And when it comes to a fast charge of caffeine, Dunkin' sure delivers. But today, the more correct statement would be, "The world runs on lithium!" And why not? Rechargeable lithium batteries powers just about everything. They would also be a necessary part of a green electric grid, as batteries are required to store renewable energy from wind turbines and solar panels. As the demand for these products grows, so does the need for lithium. Given their growing importance, demand for lithium is expected to rise five to ten times by the end of this decade, according to the US Department of Energy.

Although transitioning to lithium batteries has the potential to contribute to the development of renewable energy technology, there are concerns about its environmental impact. More on that later.

But first, what is lithium aka "white gold"?

Lithium (Greek lithos for stone) is a chemical element with the symbol Li and atomic number 3. It is a soft, silvery-white alkali metal.

Johan August Arfwedson, a Swedish chemist discovered lithium in 1817. Later on in 1851, William Bunsen and Augustus Mathiessen first isolated lithium metal. Since then, it has been used in military grease, tire production and as a mood altering pharmaceutical. By 1929, lithium was put into the lemon-lime soda 7-Up to enhance one's mood. It was banned for use in soft drinks in 1950. During this time, research discovered that lithium with its electrochemical properties could serve well as a battery anode. The rest is history – and is still being made…read on.

The problem with lithium today

The transition to lithium-ion batteries signifies a step towards sustainability with less dependence on fossil fuels. That's a positive…but there's also a negative – and an ironic one. As lithium demand increases, so does the environmental impact of lithium battery production – from mining to production to disposal. In the life cycle of a lithium battery, pollutants such as heavy metal toxins and greenhouse gas emissions are the unfortunate byproducts. On top of that, lithium aka "white gold" is expensive. So, finding a replacement for this metal could be costly and time-consuming, requiring researchers to develop and test millions of candidates over the course of years.

It's no wonder that scientists have been looking for a more 'greener' alternative to lithium – and they may have found it…and they had some super-computing help.

AI enters the research

Artificial intelligence (AI) and large-scale cloud computing are warp-speeding up the search for new battery materials. Within the past year, Microsoft and the Pacific Northwest National Laboratory (PNNL) teamed up using AI to parse out new battery materials reducing lithium dependence. And eureka! They found one.

The system analyzed over 32 million potential inorganic materials. Eighty hours later they had 18 promising candidates that could be used in battery development. By contrast using traditional lab research methods, this process could have easily taken two decades. "Thirty-two million is something that we would never ever be able to do. Imagine a human sitting and going through 32 million materials and choosing one or two out of them. It's just not going to happen," says Vijay Murugesan, a staff scientist and materials sciences group lead at PNNL.

The process from concept to the development of a working battery prototype took less than nine months. This AI-derived material, named N2116 is a solid-state electrolyte that has been tested by scientists who took it from a raw material to a working prototype.

Reinventing the battery

So, for a quick science lesson, batteries work by shuttling charged particles back and forth between positive and negative terminals, known as electrodes. When wires are connected, lithium ions move from the negative electrode, through a conducting substance called the electrolyte, toward the positive electrode.

Meanwhile, electrons travel in the same direction through the wires, enabling energy to be drawn from the battery. Most importantly, the electrolyte material must be compatible with the electrodes to allow the lithium ions to easily pass through it while simultaneously blocking the movement of electrons through the battery.

The researchers focused on solid electrolyte materials which scientists hope to develop into a safer and more efficient alternative to currently used liquid electrolytes. Although offering excellent ionic conductivity, a must-have for fast charging and long-lasting batteries, they are highly flammable or can even explode under certain conditions.

The AI-needle-in-a-haystack material is a solid-state electrolyte

It was thought that sodium ions and lithium ions couldn't be used together in a single solid-state electrolyte system due to their chemical qualities. AI proved that theory wrong. The super-computing system indicated that such a material was possible. When the researchers tested the idea, it turned out to be true.

Since the electrolyte uses both lithium and sodium, as well as some other elements, it reduces the amount of required lithium by as much as 70 percent.

Scientists were able to transform it into a working prototype that could power a light bulb. Looking ahead, it has the potential to be a sustainable energy storage solution. However, more research is needed. Kandler Smith, a mechanical engineer from the National Renewable Energy Laboratory, "Solid-state electrolytes have the advantage that they are more chemically stable and much less flammable. The downfall is that they don't move the lithium ions as quickly, so the charging times are slower." He also believes that this is an excellent starting point. Smith also pointed out that 'warp-speeding' N2116 using AI was the most impactful achievement of the work. Smith was optimistic that the same machine learning could support research in hundreds of other related areas.

The "magic here is in the speed"

Following the success of this historic achievement, Microsoft and PNNL are keen to explore more scientific breakthroughs in the future. "The new battery results are just one example—a proof point if you will," Brian Abrahamson, PNNL's chief digital officer, said in a statement. "We recognized early on that the magic here is in the speed of AI assisting in the identification of promising materials, and our ability to immediately put those ideas into action in the laboratory. We plan to push the boundaries of what's possible through the fusion of cutting-edge technology and scientific expertise."

Krysta Svore, who leads the Microsoft Quantum—Redmond (QuArC) group at Microsoft Research added, "We need to really compress the next 250 years of chemistry material science into the next two decades, right? And that's because we want to save our planet." In other words, AI could be playing an even greater part in sustainability in the near future—and so will IR.

AI and sustainability

Artificial Intelligence (AI) can play a significant role in advancing sustainability efforts across various domains. Here are several ways AI can contribute:

1. Renewable Energy: Machine learning algorithms can forecast energy production, optimize grid operations, manage renewable energy resources and improve energy storage.

2. Resource Management: AI can analyze satellite imagery, sensor data and historical records to monitor environmental changes, detect illegal activities like deforestation, and suggest sustainable practices for resource management.

3. Circular Economy: AI can identify opportunities for reuse, remanufacturing and recycling, enabling companies to reduce waste and resource consumption. It can also target opportunities for reuse, remanufacturing, and recycling.

4. Climate Prediction and Adaption: By improving climate modeling and prediction capabilities AI can promote better preparedness and enhance extreme weather forecasting.

5. Supply Chain Optimization: AI can optimize supply chains to reduce carbon emissions and environmental impact by weeding out inefficiencies, strategizing transportation routes, minimizing waste and promoting sustainable sourcing practices.

6. Conservation and Biodiversity: Machine learning algorithms can analyze data to track endangered species, monitor illegal poaching, identify conservation priorities and promote habitat restoration initiatives.

7. Behavioral Change: Smart home devices, mobile apps and online platforms can use AI algorithms to provide personalized recommendations, track environmental impact metrics and incentivize eco-friendly choices while fostering a culture of sustainability.

AI and IR at the 2024 Fall Conference!

The world could soon be running on AI…and that could be great news to IR. Learn how AI is not only helping to shape the future of IR, but how it's being used today. Sam Richter will be a featured presenter speaking on this exciting topic at the 2024 Investment Recovery Conference and Trade Show in Tempe, Arizona. See you there! ■

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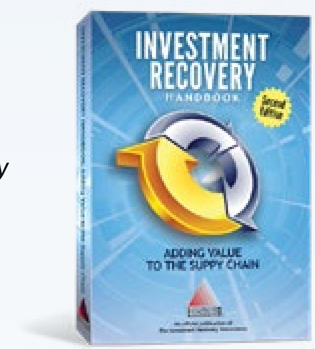
- Prepared for the exam by studying the *Investment Recovery Handbook: Adding Value to the Supply Chain* is available to use as a review. This publication is available on Amazon.



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FEATURE STORY

The Used Truck Market – What Every IR Pro Needs to Know

The 'meat and potatoes' of the used truck market are light and heavy-duty trucks. This market's predictability can be influenced by several key indicators, with freight activity topping the list. So, what are the other factors?

The real drivers of the used truck market

By becoming familiar with the market influencers that dictate resell value, you can make more informed decisions on the pricing and timing of selling these valuable assets.

Here is a list of trends and insights that impact pricing for used trucks in a dynamic market:

Increased availability of used trucks: A 7% rise in the availability of used trucks in North America highlights a shifting market dynamic, offering both challenges and opportunities for buyers and sellers alike.

Decline in used truck pricing: The average price of used trucks has dropped by 28% compared to the previous year, signaling a buyer's market...and a challenge for sellers.

Export market fluctuations: The temporary halt in truck exports presents a nuanced understanding of global market interdependencies.

Surge in late model trailer availability: An increase of price-reduced, late model trailers on the market reflects broader economic impacts and supply chain adjustments.

Strategic marketing of retail-ready trucks: To attract buyers in this competitive landscape, the importance of presenting clean, feature-desirable trucks with incentives can't be over-emphasized.

Selective inventory management: Careful consideration should be given to trucks that have fewer desirable features that may be excluded in certain inventories targeted for sales velocity and profitability.

Impact of freight activity: As previously mentioned, the direct correlation between freight activity and used truck sales remains the top driver of market predictability. *[Source: ttnews.com]*

The buyer's market in the rearview mirror

If you were a fleet owner or operator over the past four years, it's been a bumpy ride. In these unprecedented pre and post pandemic times, how can you determine having the right fleet trucks in the right class at the right volume for your fleet? In the throes of the pandemic, the economy depended on trucking to keep the country going. That resulted in more trucks being purchased, which then reduced the number of available new trucks. And to nobody's surprise led to a high demand for more used trucks…while driving up their prices.

In the 18 months after the pandemic started, used truck prices doubled and then tripled. But that has changed recently with prices dropping as more new vehicles become available…and lower resale value for older trucks.

In 2023, there was still a buyer's market for used trucks. Quite simply, as more fleets held onto their older vehicles due to pandemic uncertainty, last year saw a gradual return to their replacement rotation. That meant large numbers of well-maintained, late models are now making their way into the used truck market. For example, there was a major increase in the availability of late model, 53-foot dry van trailers. Inventory count went from 200 units to approximately 2,000. When inventory was low, the trailers peaked at $70,000—and today they are priced substantially lower—$25,000.

In addition, sought-after features once considered standard such as 11-liter engines in tandem applications, small sleeper cabs and manual transmissions, have become less in-demand.

The experts weigh in

J.D. Power director of specialty vehicles, Chris Visser stated that the performance of the auction and retail markets are reacting differently as the correction from the COVID pricing peak matures.

"Auction devaluation has largely played out, with pricing settling in roughly between the pre-pandemic peak of 2018 and the pre-pandemic bottom of 2019," he said. "Retail pricing has continued to drop, now comparable to that pre-pandemic bottom. Auction pricing is now low enough where supply and demand are theoretically close to equilibrium. On the retail side, equity, financing and a weaker freight environment have continued to limit the number of potential check writers."

Visser further commented that Class 8 retail sales volume remains sluggish, but pricing looks to be stabilizing. December to January retail data reflects little or no change which would support his contention that retail trends lag auction trends by about three months.

When Visser was asked about the market drivers in 2024, he stated simply that that there are too many trucks available for the volume of freight the nation needs to move. *[Reprint courtesy: Pamella De Leon, Senior Editor, Commercial Carrier Journal]*

Market weak? Auctions strong!

"Iron seems to be changing hands relatively well in the auction environment, while the retail environment continues to contend with negative equity and tough finance rates," Visser said. "These conditions will remain through mid-year at least, at which point the freight market could start to turn around roughly concurrently with a more digestible supply of incoming trades. Used truck pricing roughly correlates to the truck utilization rate, which most analysts forecast to bottom out sometime in the third quarter."

Looking into recent trends, Visser noted that any fleet that sells its own used equipment usually turns to the auction channel when the market is weak. "Now would be one of those times," he pointed out. "Fleets looking to offload equipment in the short term would be advised to do so now, since pricing isn't going to improve in the next few months, especially for higher-milage equipment."

NationaLease Senior Vice President of Remarketing Services Dale Tower noted that by expanding their offerings, the company has maintained adequate sales activity. However, they have seen the continued degradation of pricing as well. "Demand is uniformly down across the board with the exception of very low mileage late model sleepers," he said.

"Without an exceptional event occurring, we do not see the market returning to a sellers' market in 2024," Tower said. "There is just too much equipment available." *[ibid]*

Yellow 'fever' hits the used truck market

The big 2023 news in the used truck market was the bankruptcy of Yellow Corp. Thousands of used trucks and trailers of this trucking industry giant

Joe Raedle/Getty Images

have recently come up for auction in historical numbers. But how will the market respond?

Steve Tam, ACT Research vice president, who leads the research and forecasting group's used truck practice stated, "If [the administrators] were to dump all of that on the market tomorrow it would be a challenge for the industry to deal with," Tam said, but "they are striving very ardently to maximize the proceeds. [The administrators are] going at it with a steady approach and not looking to flood the market."

And that steady approach meant choosing a leading liquidation partner in IRA's Associate Member, Ritchie Bros Auctioneers. According to *Transport Topics*, "The decision to engage Ritchie Bros. for the auction of Yellow's equipment was a strategic move, addressing the logistical challenges of dispersing assets across various locations. [They] played a crucial role in the liquidation of Yellow Corp's assets, including over 12,000 trucks and approximately 42,000 trailers. The auction, a significant event in the commercial vehicle auctions space, raised approximately $1.9 billion, underscoring the value of Yellow Corp's assets in the freight industry." *[Source ttnews.com]*

A brighter road ahead

In 2027, the new EPA emissions standards regulations will go into effect. The mandate is expected to drive a large purchase of Class 8 vehicles that will be exempt from the emissions standards prior to January 2027. Fleet operators will view buying pre-emissions trucks as a strategic investment, to beat the compliance deadline.

From a global perspective, the used truck market size has grown strongly in recent years. It grew from approximately $45.39 billion in 2023 to a projected $48.35 billion in 2024 at a compound annual growth rate (CAGR) of 6.5%.

And keep an eye on Mexico. With their growth-anticipated economy, Mexican fleet operators need updated trucks and trailers to replace their 30+ year old fleet. This will have a positive impact on new demand from OEMs and used demand from the U.S. ■

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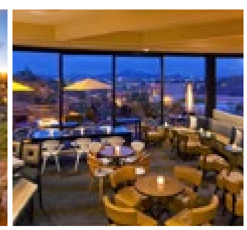


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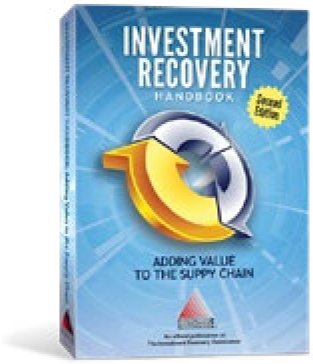

Mark your calendars for the third Wednesday of the month at 9:30 AM, Central. The Education Committee has formed a book club for the *Investment Recovery Handbook, Adding Value to the Supply Chain.* The purpose? To hear from you—the subject matter experts on what content needs to be added, removed, enhanced or updated.

Each month we will review a single chapter. Feel free to join during the months where the topic is in your area of expertise. We ask that you review the chapter being discussed prior to the meeting and have your feedback ready to share. Happy reading!

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