

The background image is a composite. It features a person wearing a hard hat, holding a smartphone. Overlaid on this is a world map with several location pins. White lines radiate from the smartphone, connecting to these pins, symbolizing global connectivity and logistics. In the lower right, there is a faint image of a large industrial vehicle, possibly a container handler or crane, at a port or warehouse.

# **How Emerging Technologies Are Transforming the Transportation & Logistics Industry**

**team**  
international

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# Introduction

Welcome to the age of Logistics 5.0.

Just as mechanization led to electrification, electrification led to automation, and automation led to digitalization, we have moved into a new era. It is no longer enough for systems to simply be “connected” to the wider world. To thrive in 2020 and beyond, firms across the logistics spectrum require technology solutions that deliver actionable insights, improved processes, and real-world results.

In this exclusive TEAM International white paper, we’ll detail four ways emerging technologies are transforming business for freight brokers, carriers, and clients alike. You’ll learn:

- How the **Internet of Things** is changing the way trucking companies proactively manage their fleets and routes
- How **3PLs** are dramatically reducing manual tasks using robots (and why those robots aren’t what you think they are)
- How **smart devices** are facilitating visibility into every facet of the supply chain
- Why the future of logistics software requires **custom development**

Let’s drive ahead into Logistics 5.0.



## *Connected Vehicles and the Internet of Things*

It is a time of evolution and tightening margins in the logistics industry. The rise of low-volume, high-frequency, and LTL shipping demanded by the Amazon economy, persistent driver shortages, and volatility in fuel prices driven by oil uncertainty have created an environment in which every penny and every mile matter.

Ultimately, any tightening in the logistics space tends to rise from freight and carrier costs. Even a slight increase in diesel prices, for instance, can resonate throughout the industry, squeezing everyone from brokers to cold-storage providers to vehicle manufacturers.



In 2017, the latest data available from the [\*American Transportation Research Institute\*](#), motor carriers spent an average of \$1.691 per mile. That breaks down into:



### Fuel

\$0.368 / 22%



### Truck/Trailer Lease or Purchase Payments

\$0.264 / 16%



### Repair & Maintenance

\$0.167 / 10%



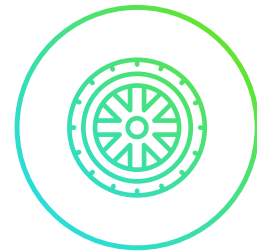
### Truck Insurance Premiums

\$0.075 / 4%



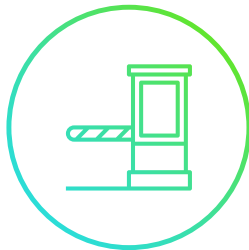
### Permits & Licenses

\$0.023 / 1%



### Tires

\$0.038 / 2%



### Tolls

\$0.027 / 2%



### Driver Wages

\$0.557 / 33%



### Driver Benefits

\$0.172 / 10%

Some of those costs – insurance premiums and licensure, for example – are essentially intractable. Others, however, can be mitigated through proactive data analysis and process optimization. That is the core driver behind the rise of the Internet of Things and smart data use in connected vehicles.

The trend goes far beyond the December 2019 electronic log mandate. Those solutions are relatively simple and set, designed to provide a ledger of hours of service and record of duty status at the driver level. Tomorrow's IoT solutions for freight carriers go far deeper, tapping into both the myriad sensors available in modern vehicles and outward technologies like global positioning to provide a constant status check on everything to do with a vehicle. This data is fed in real time to powerful cloud computing resources, where it is crunched, analyzed, and turned into actionable information for knowledge workers.

Such a solution, properly deployed, can potentially address any number of inefficiencies and cost centers for freight carriers. This should ultimately help offset driver wage pressure and partially insulate the industry from fuel uncertainty while increasing margins for the entire supply and value chain.

Where will the effects most likely be felt?

- **Fuel Costs:**

Aggregated tracking of vehicle locations, speed, fuel efficiency, and even driver operations like acceleration, braking, and shifting allow carriers to unlock rich insights on the routes and behaviors that deliver maximum MPGs. This can then be translated into operations and training to minimize fuel consumption and improve overall efficiency. In an industry where 22% of costs derive from diesel use, even a small improvement can have dramatic impacts on a company's rates and bottom line.

- **Tolls:**

Tolls add up for freight carriers. By tracking and aggregating toll payments over time, companies can optimize routes and weigh potential savings against fuel economy to deliver maximum cost savings.

- **Repair & Maintenance:**

IoT devices can tap into vehicles' existing onboard sensors to deliver failure notifications, early warnings, and maintenance reminders directly to corporate. This allows for rapid response and minimal downtime in the event of a critical failure like a blowout, as well as improved proactivity in fleetwide maintenance.

A photograph showing a group of people working at a wooden desk. One person is holding a smartphone, while others are looking at papers and documents. The scene is brightly lit, suggesting a modern office environment.

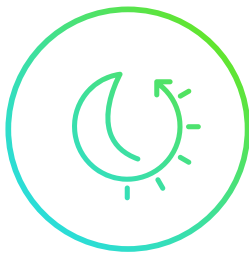
## *Reducing Non-Value-Add Tasks at Freight Brokerages*

Anyone with experience at or working with a freight brokerage knows how manual labor-and paper-intensive a business it can be.

Every order tender kicks off hours-long processes of phone calls, faxes, invoicing, receiving, and reconciliation. Driver and equipment availability need to be checked and rechecked. Schedules, licensure, and special handling requirements need to be confirmed, dispatch needs to be handled, skids and case counts need to be verified, bills of lading and OS&Ds need to be received and addressed, invoices need to be sent and payments need to be processed.

This level of paper-pushing creates a tremendous strain on third-party logistics firms' human resources, productivity, and bottom line. When every step in the process is performed manually, it is nearly impossible for them to scale or to differentiate themselves in the marketplace by providing superior client service, faster turnaround times, or more efficient scheduling.

This acute pain point is increasingly being addressed via robotic process automation. RPA is a discipline in which developers create software "bots" – not physical robots – that perform repetitive manual tasks just as a human would. In essence, software bots act like employees, except that:



**They work 24/7/365**  
with no breaks,  
vacations, or downtime



**They perform nearly  
flawlessly** according  
to their programming



**They can process  
documents and data** far  
**faster** than a human

Importantly, the barrier to RPA is significantly lower than many brokers assume. Think of a software bot like a gigantic Excel macro that isn't confined to a single system. It performs a task over and over again whenever the task is triggered, with no need for human intervention beyond occasional checks and exception management.

## ***What Can RPA Bring to a Broker?***

Contrary to some fears, software bots are not designed to replace human freight brokers. Instead, they augment human efforts and allow them to focus on knowledge work, rather than rote processes. In fact, bots have a direct impact on job satisfaction for employees of all levels. Nobody likes manual tasks or having to stay late and work weekends to churn through massive amounts of non-value-add work. RPA lets bots handle all of that.



In particular, RPA is useful for:

- **Finance and Accounting:** A significant portion of brokers' work is taken up by accounts payable and accounts receivable. Invoices are constantly coming in from carriers, and invoices need to be constantly sent out to shippers. Almost every aspect of AP and AR involves some type of task that can be turned over to a software bot. The fact that even minor mistakes in AP and AR can have grave consequences makes the space even more ripe for automation. As a result, adoption of RPA and precursor automation technologies has been swift in the 3PL world.
- **Order Tender Processing:** Whether a tender comes in via phone, email, fax, API, or EDI, it must be entered into the broker's internal systems. Software bots excel at this task, dramatically speeding processing times and increasing accuracy.
- **Bill of Lading Processing:** BoLs must be processed and stored after a load is received. Again, regardless of source, a software bot is easily capable of pulling BoL information and dropping it into internal systems for further use or archival.



## *Inventory & Supply Chain Management*

In today's world of Just-in-Time manufacturing and delivery, it is increasingly difficult for shippers, brokers, 3PLs, and warehousing firms to keep track of what is where, and when. This is further complicated by factors like temperature controls, expiration dates, and – perhaps most critically – recalls after a product is deployed in the field. Inventories, even within the same lot, are routinely scattered at warehouses, yards, and fulfillment centers across the country or world.

All this has rendered traditional, manual tracking – and even barcodes, to some extent – all but valueless. Without real-time location and condition

tracking, it is exceptionally difficult to avoid waste and rank inefficiency in the supply chain.

To combat this problem, players across the logistics spectrum are deploying tools like GPS-enabled, IoT-connected tracking sensors, ruggedized radio frequency identification (RFID) tags, and robust, custom software back-ends to realize dramatically improved levels of control over goods.

Technological evolution has made such solutions surprisingly cost-effective, even in throwaway applications. RFID, especially, is accessible for nearly any application within the logistics space.

## ***The Basics of RFID***

RFID tags are broken into two main categories. Active RFID requires an onboard battery and continuously broadcasts its own signal. This provides an extremely long read range (i.e., the distance from which it can be detected), but a much higher price point and a shorter lifespan. Passive RFID, meanwhile, requires no battery – the tags are basically an antenna and an integrated circuit in some sort of container. When a reader comes within range, the tag uses the energy from the RF wave that hits it to broadcast back that it is present. It's essentially a binary operation – the tag is either present, or it's not.

This sounds simplistic. But with proper system design and software, this little bit of information can be incredibly valuable. Many warehouses, for example, place RFID readers at points of entry and exit. If a pallet has been scanned on entry but not yet on exit, the software can instantly determine that it is in the facility. If additional readers are placed within the warehouse, it can be pinpointed to within a few meters. Not only that, each individual product within the pallet can be tagged, giving anyone with access, the precise location of individual units. This allows for distributed inventory and JIT delivery without concern over losing track of what is where, when.

RFID tracking is particularly valuable when a product has a set lifespan, or in the event of a recall. A company can prioritize the sale and shipment of consumables near the end of their useful life, or easily round up every piece affected by a recall, no matter how scattered.



A man with a beard and glasses is pointing at a laptop screen while a woman looks on. In the background, a tablet displays a design with labels like 'LOGO', 'BANER', and 'SLIDER'.

## Custom Software

So far in this paper, we've described three distinct use cases where emerging technologies are making business easier and more cost-effective for companies in the logistics space. We've explored:

- **How IoT technology and the cloud** help freight carriers reduce fuel costs, avoid unnecessary tolls, proactively maintain their fleets, and respond rapidly to breakdowns
- **How software "bots"** can help freight brokers work smarter and faster by eliminating rote manual tasks

- **How RFID** is making it possible to locate loads, pallets, or even individual products anywhere in the supply chain

All these techniques and devices can result in dramatic cost savings and increases in efficiency and accuracy. None, however, can be deployed “out of the box.”

The key to tapping the potential of emerging technologies within logistics is a strong development team. No system, regardless of its degree of complexity, can be deployed at scale enterprise-wide without customization. In some cases, this may be relatively simple configuration and testing. In others, like with software bots, an experienced hand working within established systems for the initial build is required, followed by ongoing optimization. In still more cases, true custom software development is necessary – applications built from the ground up.

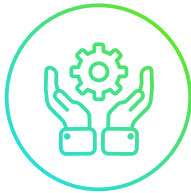
It is important to note that brokers, carriers, and others within the logistics space don’t need to go at it alone. It’s not necessary to hire a sizable in-house IT team, nor do existing resources need to be taken off-task for new projects. Instead, outsourcing to offshore and nearshore firms has become an accepted and cost-effective route to accomplish even major IT initiatives.

## ***What Does Outsourcing Look Like?***

In most cases, the outsourcing or staff augmentation firm will deploy a business analyst and subject matter expert to identify challenges and the best way to overcome them. From there, development, customization, configuration, and testing work are all handed off to a project management and delivery team responsible for completing the task.



Good outsourcing firms will offer logistics clients:



### **Full Support**

Some level of domestic presence, and an international team with excellent communication skills



### **Proven Experience**

Experience in the space, reducing the time and work involved in onboarding



### **Advanced Skill Set**

A broader and deeper skill set than would be possible hiring internally



### **Accelerated Delivery**

Rapid time-to-market, turnaround times, and iterations



### **Added Creativity**

Creative ideas meant to add value throughout the process



### **Quality Assurance**

High-quality, automated testing and bug-fixing



### **Flexible Engagement**

The flexibility to scale resources up or down as necessary



### **App & Data Protection**

Safeguards to protect your applications and data against security threats

Ultimately, custom development is the “secret sauce” behind the emerging technologies that are forever changing the world of logistics. Outsourcing offers companies an easy, cost-effective and quick door to new levels of efficiency, accuracy, and savings.

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