



Industry 4.0: Accelerating digital transformation in transport and logistics

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Supply chain pressures pave the way for reinvention

With the pandemic disrupting supply chains around the world, the road to recovery has been long and arduous for many industries. Well-documented shortages persist, but for the transport and logistics industry, an unfortunate and unpredictable series of global events have seen it placed in the eye of a perfect storm.

Fuel prices in Europe have destabilised, exacerbated by the ongoing war in Ukraine and the increasingly punitive sanctions against Russia, one of the world's largest oil exporters. Before this, driver shortages had already been rising globally, causing further problems up and down the supply chain. According to the International Road Transport Union (IRU), it's a chronic and serious global issue with effects rippling throughout supply chains, including core vehicle manufacturing components. New trucks, as well as drivers, are in short supply.

All of this is prompting organisations up and down the supply chain to embrace digital transformation and explore the role technology plays in their businesses. They recognise new efficiencies are needed in the sector or it risks falling out of step with the emerging digital economy, termed Industry 4.0 by the World Economic Forum.

The scale of disruption caused by Covid was a turning point. Just as businesses adopted new technologies to get through successive lockdowns, organisations throughout the transport and logistics industry have started advancing their digital transformation journeys at a rapid pace.

Technology in the driving seat

Recent research by EY found that digitising the supply chain is a highly effective way to “navigate disruptive forces and respond faster to volatile supply and demand.”¹ While a 2022 McKinsey survey, post the pandemic, found 77% of companies had put greater supply chain visibility at the top of their technology investment list².

This focus on visibility has been maintained – a recent follow up survey by McKinsey outlines how 60% of respondents have comprehensive visibility of their tier-one suppliers³.

However, for the transport and haulage sector, digital transformation presents several key challenges, primarily because it’s a mobile business that relies on the coverage and connectivity of mobile network operators (MNOs) and/or satellites in the remotest parts of the world.

Resilient, ubiquitous connectivity is the great enabler of digital services and new 5G networks are the game-changer. Previous mobile generations had slower speeds and patchy coverage, but the promise of 5G, with its higher capacity, lower latency, smaller cells, and edge computing, will enable more robust connectivity solutions that bring applications and processes closer to the vehicle. With a new generation of connected vehicles, haulage companies can monitor and respond to events in real-time, paving the way for intelligent transport solutions that leverage data analytics and AI for new business models.



1. www.ey.com/en_gl/insights/supply-chain/how-covid-19-impacted-supply-chains-and-what-comes-next
2. www.mckinsey.com/capabilities/operations/our-insights/taking-the-pulse-of-shifting-supply-chains
3. www.mckinsey.com/capabilities/operations/our-insights/supply-chain-risk-survey

New intelligent transport solutions enabled by connectivity

The deployment of in-vehicle systems and sensors will grow dramatically over the next decade, with the global automotive sensor market alone expected to reach \$37.65bn by 2027 up from \$16.40bn in 2019⁴.

As the amount of data collected by these sensors grows, 5G networks will be used to connect this data to powerful processors, causing an explosion in analytics capabilities. Doing so opens the door to a wealth of new data-driven possibilities including advanced telemetry, advanced driver assisted systems (ADAS) and improved driver experience.

Some of the areas where connectivity and analytics are already transforming the transport sector include:

Fleet oversight:

Wirelessly enabled sensors connected to 5G networks are driving the use of telemetry and remote diagnostic solutions, which gives truck manufacturers and haulage companies the insights they need to develop a more holistic view of their fleets. This is leading to better management of maintenance, fuel costs, compliance issues and downtime, which helps drive greater efficiency and boosts the bottom line.

Predictive maintenance:

Identifying and fixing a mechanical problem without taking trucks off the road may be the biggest benefit of digital transformation in the transport and logistics sector. On traditional internal combustion engines (ICE) fleets, by the time a dashboard warning light comes on, it's often too late. Near real-time monitoring of vehicles, coupled with AI and machine learning algorithms, will enable organisations to detect anomalous mechanical behaviour earlier. Faults can be quickly pinpointed and replacement parts lined up, meaning less time in the garage, more time on the road, and the possibility of extending the life of vehicles through more proactive maintenance.

Autonomous trucks:

On-board radar, light detection and ranging (LiDAR) sensors, and cameras for object detection in advanced driver Assistance systems (ADAS) will generate in-vehicle data that can be collected and analysed for multiple use cases. Notable examples include heavy goods driver training and the fine tuning of autonomous driving technologies.



Automated processes:

Greater use of automation across the transport and logistics sector is helping organisations reduce manual errors and cut costs. Solutions like assisted driving with advanced navigation services take the pressure off drivers, while automated tachograph reporting monitors hours worked and keeps drivers in line with regulatory requirements.

Human machine interfaces:

Data from navigation systems, touch screens, other dashboard buttons, and controls can be used to analyse driver behaviour, improve health and safety, and help reduce insurance costs. In challenging times for the sector, a better experience for the driver will help with recruitment efforts, while improved safety makes it easier to meet regulatory requirements.

Electric vehicles and sustainability:

As government regulations mandate a transition to electric vehicles and decarbonisation, sustainability has become a big issue for truck manufacturers and haulage companies. Following the Tesla model, modern vehicle design is more software-driven and dependent on connectivity. Over-the-air (OTA) upgrades and the remote monitoring of everything from fuel consumption to emissions will soon become ubiquitous and help with audit trails that demonstrate compliance.

Procurement strategies:

With more data comes more knowledge, right down to a better understanding of the performance of individual vehicle components. Comparative data can be used to tell procurement teams what works best where, in terms of parts and vehicle types. Network data can also provide proof points for challenging MNO service level agreements and help organisations identify the best mobile carriers in different countries.

Big data and analytics:

Internet of Things (IoT) solutions and eSIMs facilitate vehicle connectivity. Together, they can transform truck manufacturers and haulage companies into data-driven businesses. Applying AI and machine learning models to data from connected trucks will help transport companies explore previously unseen parameters, not just for optimising fleet management but for supporting new business opportunities.

Cloud-first solutions:

Along with 5G and next-generation connectivity, cloud solutions are the great enabler of transport digitalisation, not just from hyperscale providers like Amazon, Microsoft, and Google, but also from Software-as-a-Service providers offering specialist applications to the sector. Cloud is the perfect platform for any mobile business, giving them the scale and agility to operate in a country without having a physical footprint there. Without it, collecting and analysing every byte of data from different corners of the world would be overwhelming.

What sensors do

Sensors have always been used to track the mechanical health of a vehicle, measuring performance parameters across everything from brakes and tyre pressure to lights and electrical systems. They send signals to electronic control units (ECUs), which make automatic adjustments based on predefined algorithms, or alert drivers that action may be required.

Today, sensors are increasingly enabled for wireless connectivity and IoT use cases. An engine alone can have 15 to 30 sensors, while the total number across the vehicle could be anywhere between 50 and 200. Different protocols are used to either transmit the data internally inside the vehicle, or externally over mobile networks for near real-time processing and analysis.

This is a significant change for truck manufacturers and fleet management companies. In the past they could only analyse data when vehicles came into the

garage for maintenance. Now they can carry out remote diagnostics and reduce time spent off the road.

According to Research & Market, the global automotive remote diagnostics market will grow from \$10bn in 2021 to \$25.4bn by 2027⁵. New use cases include tracking temperatures in cold chain transport and using data to help reduce fuel consumption. For example, The Wall Street Journal reported that Saia LTL Freight installed IoT sensors on 3,000 trucks and used the generated data to increase fuel efficiency by 6% in the first year⁶. The \$15m savings were greater than the cost of the initiative.

5. www.researchandmarkets.com/tag/remote-diagnostics?ac=true&oq=automotive%20remote%20diganostics

6. www.wsj.com/articles/internet-of-things-reaches-into-the-trucking-business-1430342965



Connectivity obstacles to be navigated

As more advanced sensors and software become standard on trucks, the transport and logistics sector has a golden opportunity to undergo the kind of profound digital transformation that has already reshaped other industries.

However, the extent to which it can benefit from this new wave of solutions is entirely dependent on the availability and quality of cellular connectivity. Ensuring a wireless service is robust and resilient enough to support increasingly complex use cases is not easy. Guaranteeing consistency across multiple countries and continents is almost impossible without third-party assistance. Trucking and transport companies embarking on a digital transformation journey need to be aware of the challenges involved.

Negotiating MNO contracts:

Haulage companies face having to negotiate multiple MNO agreements across different territories, which takes time and expertise. MNOs with operating licenses across continents can help simplify choices, but that is no guarantee of service quality or coverage. Sometimes, the merits of a network should be considered on a country-by-country basis. However, for businesses who want the ability to switch providers as needed, this can be a complex process, negotiating country-level agreements in multiple regulatory environments.

Other organisations will prefer a “Bring your own MNO” approach, where existing arrangements, and the infrastructure, pricing, and service level agreements that come with them, make more sense.



Navigating MNO service flaws:

MNO coverage varies enormously within countries, not just between them. Signal drop-out can interrupt important over-the-air updates (OTA) or stop real-time data getting through, even in areas where the coverage is supposed to be good. MNOs rarely share granular insights into network performance, which makes root cause analysis hard when there's an issue.

Understanding local regulations:

Permanent roaming is prohibited in countries like Brazil, leaving companies with no option but to sign up with a local MNO. Unique regulatory requirements around taxes, as well as communications, can be an obstacle to entering new markets and limit the scope of a haulage company's growth ambition. In these jurisdictions, local expertise, and relationships are vital.

Integration with business systems:

Collecting data from trucks is one thing but integrating it with other business systems is a whole different challenge for transport and logistics companies. Few have the technical skills to integrate in-vehicle devices with backend IT systems, or the backend infrastructure to maximise new opportunities, particularly around data collection, collation, and analytics.

Empowering people with the data they need:

Fleet management teams will have different needs from the data generated by connected vehicles. The telemetry/maintenance role is firmly established, but when data carries insights into assisted driving technology or human-machine interfaces, it needs to be surfaced in different dashboards for other user groups. Data only has value if it reaches the people who need it.

How Cubic³ helps:

Our smart connected software solutions enable the world's leading transport, construction, mining, and two-wheeler brands to harness the power of software-defined vehicles.

We unlock the potential of smart connectivity, helping you scale globally and accelerate growth.

We ensure reliable, seamless connectivity in even the most remote locations, enabling real-time vehicle tracking and updates. This means enhanced operational efficiency, route optimisation, and fleet management.

Cubic³ Cloud

Smart, secure, and truly global. Cubic³Cloud simplifies every aspect of connectivity management, providing seamless global coverage, centralised control, and unmatched scalability.

Cut through complexity

Our global expertise navigates regional compliance with ease, handling the most complex, region-specific challenges. From regulatory requirements to cybersecurity, we take care of this, so you don't have to.

Data-led decision making

Our advanced analytics provide you with valuable insight into your fleet's performance, enabling you to make data-driven decisions in areas including predictive maintenance and autonomous operations.

Unrivalled global reach

Stay connected everywhere with access to 550+ mobile networks across over 200 countries, offering comprehensive coverage for 2G, 3G, 4G LTE, and 5G connectivity.

Centralised control

Our one contract, one integration, one platform allows you to streamline operations by managing SIM lifecycles, OTA updates, and all connectivity needs in real-time, through a single point of access.

Effortless scalability

Grow your operations quickly and easily with our cloud-native platform, designed to adapt seamlessly to local markets. Drive your organisation's future growth with unmatched agility and network performance.



About Cubic³

Our connected intelligence solutions ensure the world's leading automotive, agriculture, and transport brands are harnessing the power of software-defined vehicles, delivering enhanced customer experiences and driving revenue.

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