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INDUSTRY 4.0

ACCELERATING DIGITAL TRANSFORMATION IN TRUCKING, LOGISTICS AND TRANSPORT





SUPPLY CHAIN PRESSURES PAVE THE WAY FOR REINVENTION

After the pandemic disrupted global supply chains, it was a long way back for all types of industry. Well-documented shortages persist, but for the transport and haulage industry, where the rubber literally hits the road in supply chains, other factors emerged, placing the sector in the eye of a perfect storm.

Fuel prices in Europe are soaring, exacerbated by war in Ukraine and sanctions against Russia, one of the world's largest oil exporters. Before this, driver shortages had already been surging globally; 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 supply chain companies to reset and embrace digital transformation and the role technology plays in their businesses. They recognise that new efficiencies are needed in a sector that risks falling out of step with an emerging digital economy, what the World Economic Forum calls Industry 4.0.

The scale of disruption caused by Covid was a turning point. Just as many businesses adopted new technologies to get through successive lockdowns, transport and logistics are significantly advancing their digital transformation journeys.

TECHNOLOGY IN THE DRIVING SEAT

Ernst & Young found that 92% of companies didn't halt technology investments during the pandemic[1]. The research suggests digitising the supply chain is a way to "navigate disruptive forces and respond faster to volatile supply and demand." According to McKinsey, 77% of companies surveyed said they had put greater supply chain visibility at the top of their technology investment list.[2]

For the transport and haulage sector, digital transformation presents particular challenges, primarily because it's a mobile business that relies on the coverage and connectivity of MNOs (Mobile Network Operators) 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, bringing 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, not just to improve efficiencies that help address current challenges, but to pave the way for intelligent transport solutions that will leverage data analytics and AI for new business models.



[1] EY: 2020 supply chain survey
[2] McKinsey & Company: Taking the pulse of shifting supply chains



A NEW WAVE OF TRANSPORT SOLUTIONS ENABLED BY CONNECTIVITY

The deployment of in-vehicle systems and sensors will grow dramatically in the next decade – the global automotive sensor market alone is expected to reach $37.65bn by 2027 up from $16.40bn in 2019[3]. With more sensors creating more data points, and 5G networks connecting them to the compute power that can process them, data analytics will explode, whether it's for advanced telemetry, ADAS (Advanced Driver Assisted Systems) or a range of indicators to measure and improve haulage processes and the driver experience.

[3]Allied Market Research

SOME OF THE AREAS WHERE CONNECTIVITY AND ANALYTICS ARE TRANSFORMING THE TRANSPORT SECTOR INCLUDE:



FLEET OVERSIGHT

Wirelessly enabled sensors connecting to 5G networks will drive the use of telemetry and remote diagnostic solutions. The data generated will provide both truck manufacturers and haulage companies with the insights they need to develop a more holistic view of their fleets. Better management of maintenance, fuel costs, compliance issues and downtime will drive efficiency and boost the bottom line.



PREDICTIVE MAINTENANCE

Identifying and fixing a mechanical problem without taking trucks off the road may be the biggest win of all. On traditional 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 allow data to be used to detect anomalous mechanical behaviour earlier. Faults can be 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.



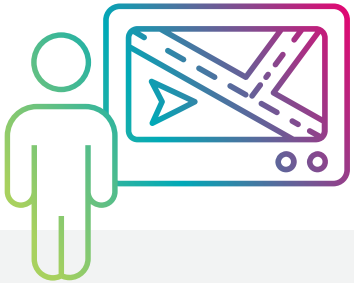
AUTONOMOUS TRUCKS

On-board radar, LiDAR (Light Detection and Ranging) sensors and cameras for object detection in ADAS will generate in-vehicle data that can be collected and analysed for multiple use cases, including heavy goods driver training and the fine tuning of autonomous driving technologies.



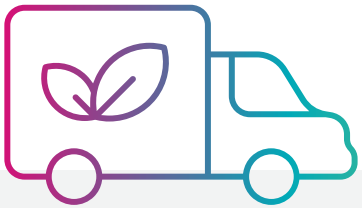
AUTOMATED PROCESSES

Not just in the warehouse but out on the road, the haulage sector is looking to automate more processes, reduce manual error and cut costs. Assisted driving with advanced navigation services will take the pressure off drivers; automated tachograph reporting will monitor hours worked and keep drivers in line with regulatory requirements.



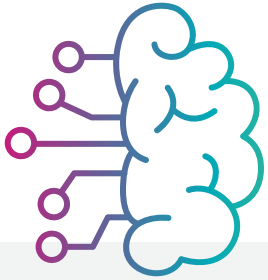
HUMAN MACHINE INTERFACES

Data from navigation systems, touch screens, other dashboard buttons and controls will be used to analyse driver behaviour, to 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. Improved safety will make it easier to meet regulatory requirements.



ELECTRIC VEHICLES & SUSTAINABILITY

As government regulations mandate a transition to electric vehicles and decarbonisation, sustainability will become a big issue for truck manufacturers and haulage companies. Following the Tesla model, vehicle design will be software-driven and more dependent on connectivity. Over-the-air upgrades and the remote monitoring of everything from fuel consumption to emissions will 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 will tell procurement teams what works best where, in terms of parts and vehicle types. Network data will provide proof points for challenging MNO service level agreements and identifying the best mobile carriers in different countries.



BIG DATA AND ANALYTICS

IoT solutions and eSIMs facilitate vehicle connectivity. Together, they will 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. Data could demonstrate supply chain reach in a country, or performance improvements that will appeal to cost-conscious customers.



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

*When Saia LTL Freight installed IoT sensors on 3,000 trucks, the data generated helped increased fuel efficiency by 6% in the first year - the **$15m savings** were greater than the cost of implementation.*

Sensors have always used 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 ECUs (Electronic Control Units), 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; 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 big 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 2027.

New use cases include tracking temperatures in cold chain transport and using data to help reduce fuel consumption. 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 year. The $15m savings were greater than the cost of the initiative.

CONNECTIVITY OBSTACLES TO BE NAVIGATED



As more advanced sensors and software become standard on trucks, the sector has an opportunity to undergo the kind of digital transformation that is reshaping other industries. But there are obstacles for a mobile business. Transport's ability to benefit from a 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 countries and continents is almost impossible without third-party help. Trucking and transport companies embarking on a digital strategy need to be aware of the challenges.



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 in itself is no guarantee of service quality or coverage. Sometimes, the merits of a network should be considered on a country-by-country basis; for businesses seeking the option 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 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; integrating it with other business systems is a whole other challenge for transport companies. Not many 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.

For over a decade, Cubic Telecom's connectivity and analytics solutions have been enabling vehicle manufacturers and fleet management organisations to become powerful data-driven businesses.

Our single software solution allows any vehicle shipped anywhere in the world to have built-in compliance across local markets, extend lifecycle value and drive competitive advantage.

HOW CUBIC TELECOM HELPS

SIMPLIFY GLOBAL ROLLOUT

PACE, Cubic's connectivity management platform, can be embedded in trucks at the point of manufacture or distribution. Zero-touch deployment enables fast entry to new markets. A vendor-agnostic platform, PACE avoids MNO, SIM or platform provider lock-in. Fleet migration to a new MNO can be pushed out to the eSIM at any time.

CUT THROUGH COMPLIANCE COMPLEXITY

PACE simplifies regulatory compliance – legal, tax, security – in even the most challenging regulatory environments, such as Turkey, Brazil and the Gulf States. The platform also facilitates over-the-air updates to keep up with fast-changing regulatory requirements.

GAIN GRANULAR INSIGHTS

Cubic's Connected Intelligence software helps fleet managers apply data analytics to a range of vehicles and IoT devices, even if they're connected to different MNOs. Granular insights provide crucial indicators of performance and bandwidth utilisation across different territories and operators.



INFORM PROCUREMENT DECISIONS

The performance of a truck component or network can be analysed and compared to help inform subsequent procurement decisions. The ability to correlate data from different vehicle makes/models and MNOs in different countries makes it possible to identify technical variables at a granular level, providing data to challenge MNO service level agreements or diagnose a technical issue in the vehicle.

INTEGRATE WITH THE WIDER BUSINESS

Cubic's open-source software and APIs allow for seamless integration with enterprise systems as well as in-vehicle sensors and ECUs, facilitating end-to end service visibility through a customisable customer portal.

TAILOR DATA TO DIFFERENT USERS

Administrators can view and share insights about fleet performance and analyse key indicators in real time through dedicated portals. Alerts can be filtered by vehicle make/model or region for proactive problem identification and resolution. Fleet management executives can use data driven insights to make strategic, evidence-based decisions.

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ABOUT CUBIC TELECOM

Cubic connects over 11 million vehicles and devices in 190 countries worldwide. With core networks in countries with particularly complex requirements, Cubic's customers gain access to our global portfolio of Tier 1 mobile network partners in more than 190 countries worldwide.

Cubic's award-winning technologies are industry-proven and technology agnostic, making us the partner of choice for some of the world's leading transport, automotive, agriculture and technology brands, including Audi, Microsoft, Iveco, Kymeta, Panasonic Automotive, Volkswagen, CNH Industrial, Skoda, e.GO Mobile and Arrival.

Headed by CEO Barry Napier, Cubic Telecom is privately held with over €110 million in funding by Audi Electronics Venture GmbH, Qualcomm, Valid, the European Investment Bank, Enterprise Ireland, and the Ireland Strategic Investment Fund, among others.