50 Years of Growth, Innovation and Leadership

Impact of Mega Trends on the Business and Operating Models of Commercial Assets

A white paper by Frost & Sullivan

FROST & SULLIVAN

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Exploring the relationship between SRM and 'mega trends'

The benefits of connectivity, information exchange, and real-time data treatment will become more relevant in the future Connected, Autonomous, Sharing and Electrified (CASE)-supported commercial vehicle environment than ever before. CASE convergence—and the potential new business it drives—is seen by many industry leaders as a clear opportunity for brand differentiation, as demonstrated by billions of dollars in investments within the last three years.

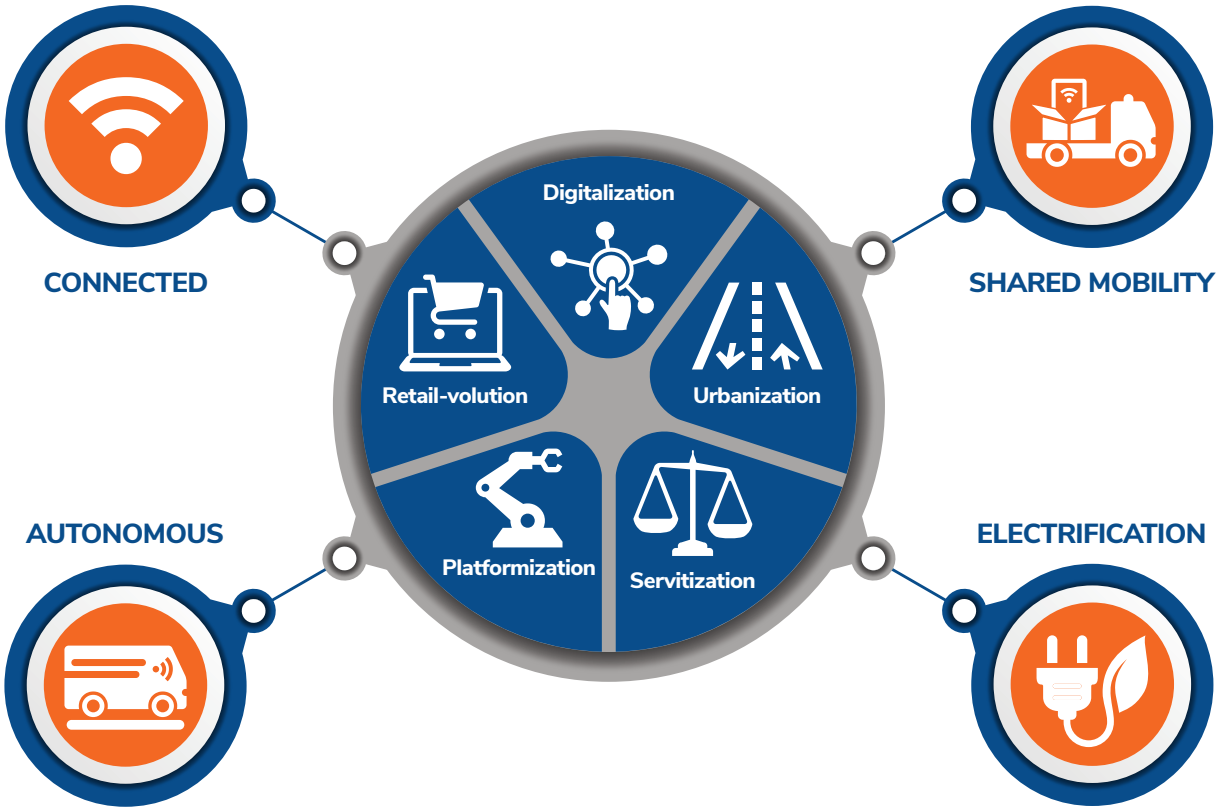
Many OEMs are already testing autonomous and electric mobility assets and are expected to launch them commercially in the next few years. OEMs and technology providers are rapidly moving into the autonomous trucking space to deliver solutions, forging partnerships with IT solution providers to accelerate the showcasing of Level 4 and Level 5 autonomous driving capabilities. The United States is working toward passing an overarching federal framework called the SELF DRIVE Act, which will allow automakers to deploy up to 25,000 self-driving vehicles in the first year, with that cap rising over three years to 100,00 vehicles. While China is expected to lead electrification of powertrains and contribute to 50% of global electric truck sales due to central and provincial impetus, North America will be the second-biggest market due to new, active, disruptor activities. There are an estimated 16,000 freight brokerage firms in North America, and it is expected that each of these brokers will be digitizing their product offering.

With the advent of connected trucks, various new business models and revenue generation opportunities will be available for all players across the value chain. Telematics providers are offering various value-added services to fleet operators to improve their productivity, based on various factors. Vehicle maintenance factors such as prognostics and remote vehicle diagnostic capabilities are increasingly gaining prominence among fleets. Due to the proliferation of advanced technologies, repair and maintenance will inherently increase as well. Truck parts will become more expensive and new diagnostic equipment will be required in shops to properly service these vehicles. As a result, the spend per vehicle (a measure of the average cost per truck for maintenance and repair parts and accessories) in dollars is highest in the United States because it is an advanced economy with many large truck fleets operating nationwide.

The 5 'mega trends' helping Service Relationship Management (SRM) drive new business models

Trends related to CASE within commercial assets are not unfolding in isolation but in congruence with five mega trends. Frost & Sullivan believes that these five transformational trends, in addition to CASE, will not only impact commercial assets but also a broad range of diverse participants. Among those who stand to be affected are OEMs, component and independent service centers, mobile service providers, and asset managers who have full or partial control of the asset. Component manufacturers for trucks, trailers, and reefers, who tend to know the most about the asset, from parameters related to optimal usage and performance to specifications related to repair and maintenance, are also in line to be impacted by these trends.

MEGA TRENDS IMPACTING COMMERCIAL ASSETS



- **Digitalization:** The generation and communication of data and information is the vector supporting collaboration and analytics. Digitization used in freight brokerage affects the intensity of the use of commercial assets and even their mode of ownership. By increasing the visibility of each step of maintenance events as well as the overall service lifecycle and history, SRM ensures better control and insight into asset service and extends asset availability.

- **Urbanization:** The emergence of urban logistics and same-day delivery in an environment of strengthening emission and safety regulations requires both assurance of compliance of assets and the management of fleets with a mix of solutions. By providing rigorous, auditable maintenance records and being powertrain-agnostic—even allowing the seamless integration of bots and drones as assets later on—SRM is a direct enabler of the transition to diverse asset operation in the emerging urbanization model.

- **Servitization:** Servitization infrastructure is growing rapidly through the emergence of rental, leasing, and managed care business models, with risk management, measurement, control, and pricing being key. In the rise of truck as a service, servitization will result in the transfer and centralization of accountability to maximize availability and also minimize total cost of usership. The complete control of asset status during maintenance, and the ability to proactively act upon it between events through data analytics provided by SRM, will be a key element in supporting profitability of operations and satisfying customers.

- **Platformization:** Many OEMs in the commercial assets space have now fully embraced the concept of platforms and modules in their product development. SRM's ability to provide a shared collaborative platform to manage and control the systematic gathering of asset and service data and information will allow all parties to better exploit this commonality. As platformization paves the way for multiple partner integrations, there will be huge data and transaction exchanges happening in real time, eventually creating a pool of structured data. While an OEM-led platform's primary focus will be to glean vehicle or component-specific data to develop business intelligence, an SRM-led platform can act as a central hub, providing holistic insights across partners.

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- **Retail-volution:** OEMs and aftermarket players will move away from traditional distribution. Service-based offerings will become more important than the asset itself in retailing. The aggregation of services through online platforms will spur the development of services offered out of mobile units. Whether services will be performed in mega truck centers located along logistics corridors and hubs or in distributed locations, there is a need to secure and preserve a common access point to all relevant maintenance data, as well as to ensure collaboration with all other relevant parties in the ecosystem to offer services such as diagnostics and prognostics, and to improve vehicle efficiency and availability.

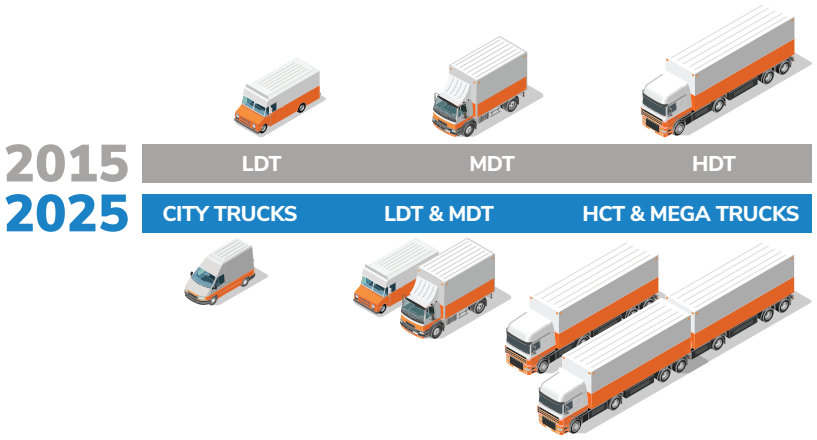
As seen in these multiple cases, many of the success factors needed to facilitate the deployment of new shared business models and foster their adoption recurrently come back to the ability to manage and optimize a prime user service and repair experience.

Successful collaboration is dependent on communications, connectivity, control, and consistency—the four pillars of Decisiv's "4C" assessment methodology. Collaboration can be realized through rich, extremely actionable information linked to real-time status information, risk assessment, and supportive analytics that minimize the impact of an asset service event. These are the very functions that the Decisiv SRM Ecosystem provides throughout the lifecycle of an asset and across the multiple participants within that ecosystem.

In this CASE-ified future, SRM positions itself ahead of the value chain as it enables the information to be controlled, offers the attributes, and governs the decision points essential to drive service events instead of being subjected to them or reacting to them:

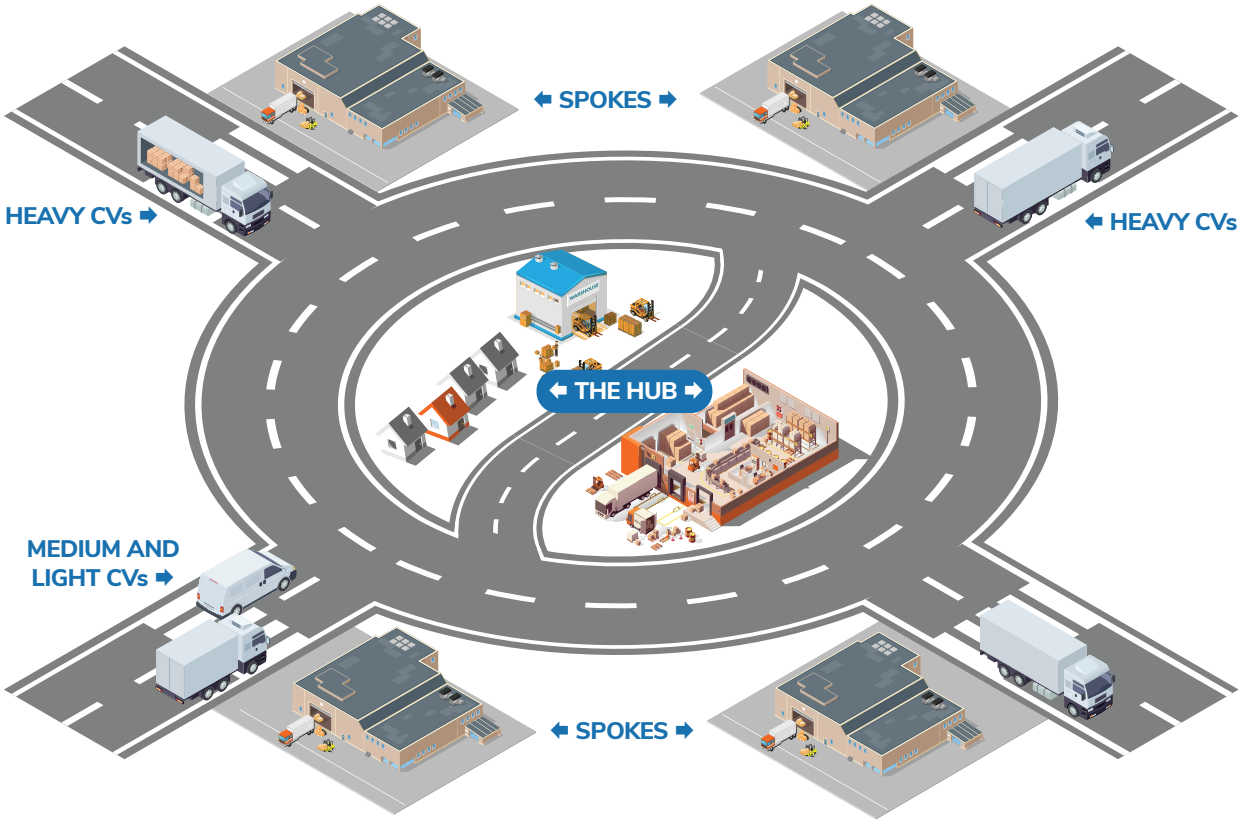
- As an example, in a pool of shared, autonomous vehicles, SRM will empower the management systems to optimally switch assets, manage locations, and coordinate service events, ranging from micro-services such as vehicle cleaning or washing to major, service-critical interventions.
- SRM serves the function of intelligent control point that enables delivery of on-demand services whether they are requested by a customer, OEM or other provider or determined via asset-automated decision.

Simplified management of multi-modal commercial assets enabling improved operational efficiencies



The future of logistics involves many transformational elements that reinforce and extend the supply chain services continuum, with real-time data flow supporting the integration of multiple, complementary, and collaborative solutions designed to provide a specific edge and deliver higher efficiency in their area.

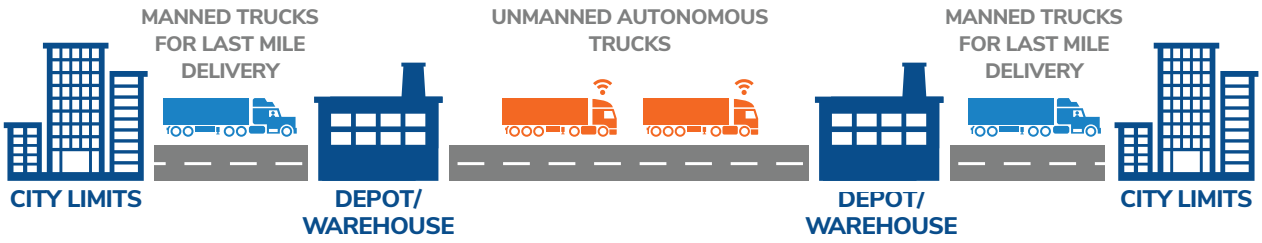
ILLUSTRATION OF MULTI-MODAL COMBINATION



Favored by these are intelligent, connected systems and optimized flows with location-based services, optimized transport corridors, dedicated hubs, and distribution networks converging into last-mile delivery, with a plurality of combinations and development of truly multi-modal commercial assets.

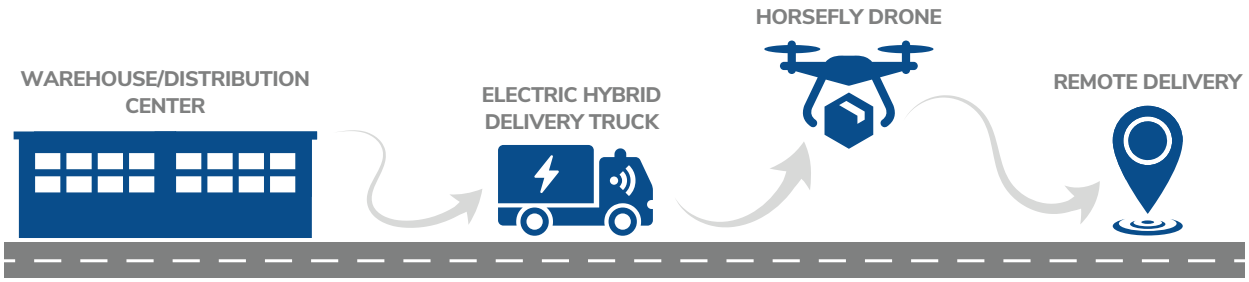
Autonomous driving in long-haul hub-to-hub transportation:

- With the advent of Level 4 autonomous driving, long-haul hub-to-hub autonomous trucking will provide an optimal operating environment for early application due to its lower complexity and controlled conditions than urban logistics. Unmanned trucks will travel back and forth from warehouses to depots while being monitored by fleet employees in case of any issues. They will be in geo-fenced areas along highways, allowing for the lower-cost, quasi-absence of drivers, higher safety, and intensive (24/365) use.
- These autonomous trucks will either be taken over by a truck driver to finish the delivery within city limits or cargo will be dropped off at the depot or warehouse for urban delivery.



Future Last-mile Delivery Models

- Advances in battery technology will lead to the introduction of cost-effective fleets comprised of short-haul delivery electric trucks in the urban and semi-urban space with larger loads. Such vehicles are expected to progress at a CAGR of 28% between 2018 and 2025.
- Concurrently, models of ground or air droid delivery will facilitate same-day delivery as a norm. Delivery patterns will evolve to same-hour delivery, and delivery bots will integrate navigation and sense-and-avoid technology to steer clear of pedestrians and jump over elevated ground. Due to airspace governance and safety concerns, drones could be camera-equipped with human monitoring.
- Combined delivery models involving a drone delivery system and an electric light commercial vehicle used as a launch pad (such as the Horsefly Drone tested by Workhorse, in collaboration with UPS) are reported to offer sizable savings potential.
- In 2017, the US government initiated the Unmanned Aircraft System Integration Pilot Program, allowing state governments to partner with private drone companies and accelerate safe drone integration. Globally, the number of delivery drones in the e-commerce sector is expected to grow at a CAGR of 88% between 2018 and 2025.



In this future landscape, commercial assets will need to not only co-exist but constantly interact, including manned and unmanned, air or ground-based, large or small, fueled or electric, traditional or with emerging or yet-to-be-invented technologies (carbon fiber, sensors, cameras, AI, etc.). As this landscape unfolds, micro-hubs will be created to serve emerging micro-markets. This will create a demand for additional assets to deploy in case of an asset breakdown. Hence, the value of securing maximum availability and uptime, and maintaining and integrating a seamless stream of service information, including prediction and scheduling of regular preventive maintenance in a technology-agnostic way, will again distinguish Decisiv's SRM Ecosystem as a platform of choice to ensure availability and optimized performance for any type of multi-modal commercial assets.

The role of SRM analytics and data in future investments

The duality of functionalities supported by an SRM platform allows stakeholders to use the SRM analytics and reporting capabilities or integrate asset and service data into their own BI practices. In either case, stakeholders can take advantage of information for better informed and more insightful decisions with regards to commercial assets:

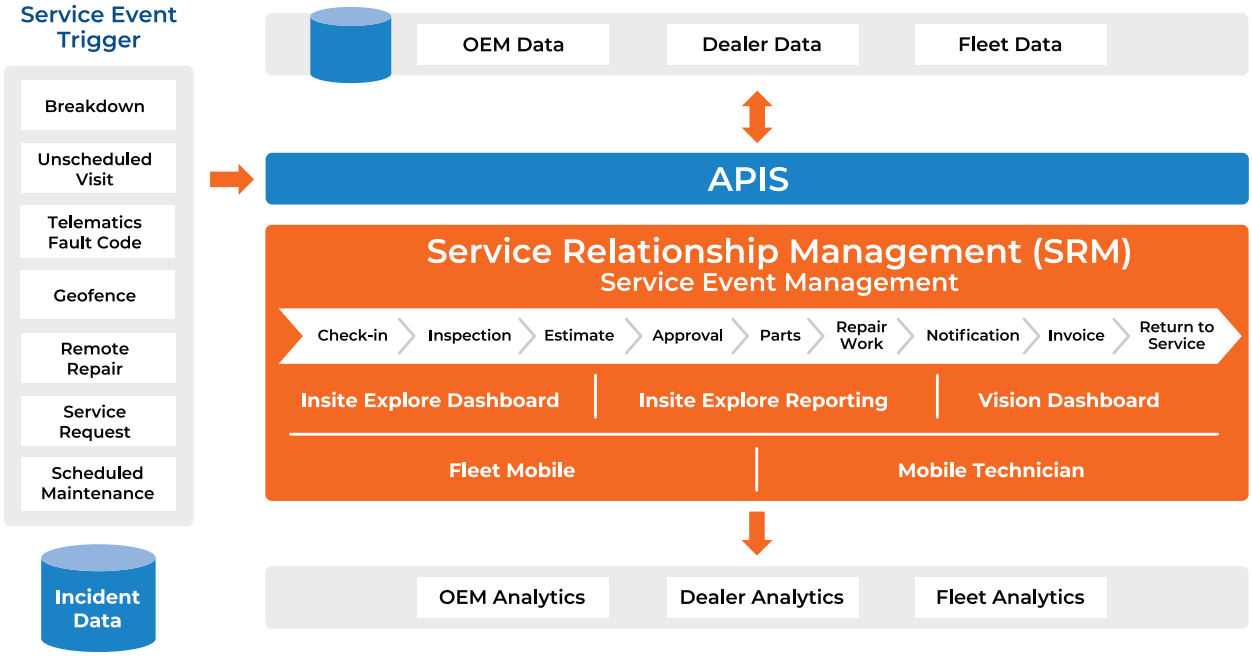
- Real-time information allows pertinent decisions "on the go" through access to relevant metrics and up-to-date information. Decisions can even be automated through role-based rules setting, such as specific cases for repair authorization.
- Higher data quality, accurately accumulated throughout the life of an asset, allows ecosystem participants to analyze performance, establish trends, detect deviations, and quickly and accurately identify issues with enough depth of information to answer specific questions about asset utilization, warranty, and parts consumption.
- Cross-checking of information between assets provides additional insights on substandard performance and impacts to the cost of ownership, down to the level of clearly identifying potential outliers.

Such information can be the basis for reports, whether customized to address a particular point or automatically generated and selectively targeted at specific users and selective distribution. Whether providing insights on the assets currently under management or on the service operations themselves, the accurate knowledge of pertinent KPIs and qualitative factors serves as the basis for better-informed decisions on future investments.

Conclusion

The average age of a truck is estimated to be nine years across 20 key markets, as of 2019. With growing innovation in the form of CASE-related technology content, commercial assets will have a longer road life in the future. As such, increasingly older commercial assets operate on the road for substantially more hours and days, and both fleets and independent operators are holding on to aging assets due to serviceability of modern trucks. Whether old or new, assets on the road are connected to people, places, systems, and things through Decisiv and its SRM platform.

ASSET SERVICE MANAGEMENT PROCESS



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