

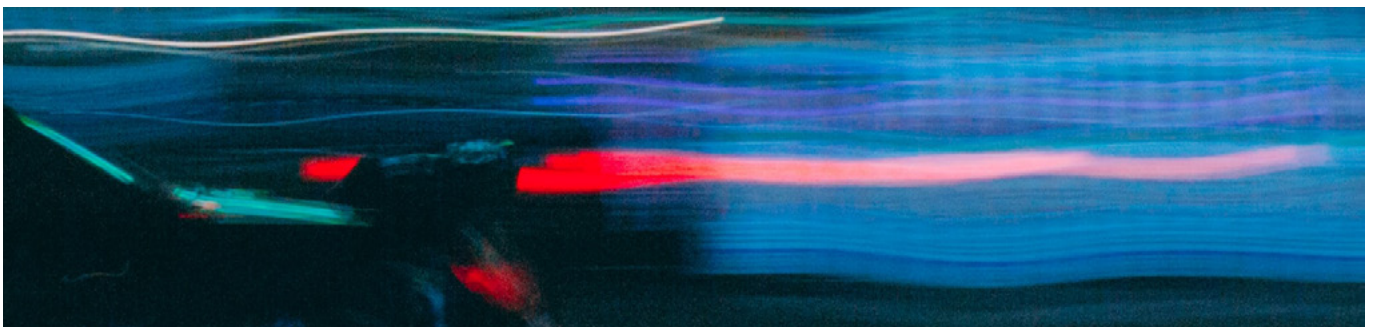


## OPPORTUNITY #23

What if the next wave of car technology innovation was in the wheels?

# MULTI-PURPOSE WHEELS

A series of technological innovations in the wheels redefine the future of car transport – from maglev (magnetic levitation) solutions and drone-like technologies, to the replacement of rubber in tyres and new ways of conceptualising the function of wheels on a car.



### MEGATREND

Materials Revolution

### TRENDS

Advanced Mobility  
Air Pollution  
New Materials

### SECTORS AFFECTED

Materials & Biotechnology  
Automotive, Aerospace & Aviation  
Chemicals & Petrochemicals  
Communication Technologies & Systems  
Consumer Goods, Services & Retail  
Cyber & Information Security  
Data Science, AI & Machine Learning  
Energy, Oil & Gas & Renewables  
Financial Services & Investment  
Infrastructure & Construction  
Insurance & Reinsurance  
Logistics, Shipping & Freight  
Manufacturing  
Government Services



## WHY IT MATTERS TODAY

Tyres and brake systems produce large amounts of microplastics as by-products. Up to 100,000 tonnes of microplastics from tyres end up in the ocean each year and a further 40,000 tonnes of microplastics come from wear and tear on car brakes. With the average scrapped car tyre weighing 9 kg, the amount of microplastics discharged into the ocean is equivalent to 11 million tyres each year.<sup>451</sup>

Research suggests that nanoparticles generated from road traffic can cause harm, and increased road traffic is a major cause of high particle concentrations in polluted urban areas.<sup>452</sup> Atmospheric particulate matter was recognised as the leading cause of 43,000 premature deaths in Europe by the European Environment Agency in 2015.<sup>453</sup>

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## THE OPPORTUNITY

The transport landscape is changing. Imaginative new applications of drone or maglev (magnetic levitation) technology could be the future. For example, in one scenario, there could be hybrid vehicles that are capable of running on electricity or alternative fuels but that switch over to maglev mode when the infrastructure is available. This would prevent the release of nanoparticles of dust, plastic and minerals into the atmosphere, as well as reducing noise levels. Such solutions would make the roads cleaner, improving ecosystems and human health.

Replacing rubber tyres with new materials and new wheel and brake technologies can minimise wear and tear on both vehicles and road surfaces. When used safely, lower-friction – or even frictionless solutions, augmented by advanced machine intelligence and autonomous systems – can cut energy consumption, enabling electric vehicles to travel further.

Wheels could become multifunctional. Rethinking the functionality of wheels and tyres beyond simply transportation and carrying the load of the car could lead to the development of wheels that can generate energy, filter nanoparticles and absorb emissions, among other applications.

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## BENEFITS

Cleaner and healthier cities. Reduction in the energy needed to run vehicles. Lower consumption of rubber (petrochemicals). Further innovation.

## RISKS

Reduced friction and therefore reduced road adherence, requiring vehicles to have ultra-advanced safety systems to compensate for slippery surfaces as well as advanced road and safety management systems. Complete dependence of drivers on automated safety systems even under normal driving conditions. Increased cybersecurity risks.

