

Digital Technologies and Sustainability – identified synergies, challenges and anticipated impact on the transportation business segment

Alina-Maria Papa

¹Asebus, Romanian-American Business School, EMBA, MBA, Bucharest, Romania

²Sustainability Commercial Business Partner and CSR manager, Bridgestone EMIA, Zaventem, Belgium

E-mail: alina.maria.vasile@gmail.com

Abstract. Under increasing pressure to decarbonize, in order to stay compliant and competitive, transportation industry is actively looking for the right next steps and actions. The main challenge is to become greener in an effective way that ensures the business performance. Technology and digital solutions, from electrification to artificial intelligence, help to accelerate the transition towards sustainability. However, they currently come with a significant share of risks mainly due to the still weak infrastructure and the unprepared workforce which could generate an inefficacious usage of digital technologies. In this complex environment and lacking reliable data and benchmark to guide their next moves, the fleets have to make their decisions concerning suppliers, partners or tools. While the direction is clear, it's critical now for the transportation players to speed up into the execution of decarbonization. This will allow them to take business advantages as early movers, and to deal on the way with operational aspects in order to secure their productivity. Starting from the today's landscape of the industry, this article highlights the outputs of existing researches, aiming to provide a structured frame of the key inquiries and to identify possible paths for fleets, on their journey towards sustainability.

Keywords: *transportation, fleet, decarbonization, technology, digital, solutions, electrification*

Introduction

In the current context, when pursuing sustainability became a real need for preserving planet and life for the future generations, it started to be very clear that mobility will play one of the key roles in this process. Actively pushing in that direction, European Commission is seeking to have at least 30 million electric vehicles on the roads by the end of this decade, seeing electrification as one of the main ways to reach a more sustainable mobility. Referring to the transportation segment, the truck and bus category is also under heavy scrutiny, as the European Union established as target a reduction of average CO₂ emissions from new heavy-duty trucks by 15% in 2025 and by 30% in 2030. The plan is to stimulate zero and low carbon emissions vehicles and to request extra fees for the polluting ones. There is clear evidence of the increasing pressure to have more sustainable options when we talk about transportation, no matter that is for business or for personal travelling. This evolution towards new solutions for a more sustainable mobility is linked to the digital transformation and technology. The question is how digitalization can accelerate the transformation of various transportation categories (for goods and people) under the urge of a very tight timeline. Society, businesses and policy-makers need to put together various types of resources such as human and financial ones, technical tools, and supporting regulations. The objective is to enhance so called *twin transition* (green and digital), to obtain a positive impact of the transportation industry, a key player in mobility.

Synopsis of the main latest digital technologies to boost sustainability

Linked to the Electric Vehicles (EV) predicted switch, the transportation industry is actively seeking for complementary solutions to reduce its carbon emissions, such as fast-charging infrastructure and hydrogen fuel cells. A future eco-friendly transportation would require an adapted infrastructure to reduce the downtime and meet customer's needs. Fuel Cell Electric Vehicles (FCEV) are seen as the next big thing in the whole transportation market. Especially when talking about the trucks, the experts anticipate a significant growth of FCEV in the second half of this decade. On top of reducing carbonization, Fuel Cell (Hydrogen) technology announces also business advantages such as longer distances without recharging, more weight load on the trucks as hydrogen tanks are lighter and a reduction of the Total Cost of Ownership (TCO). Mobility sector (and especially the commercial segments like goods and people transportation) uses already the latest technologies such as artificial intelligence (AI), Internet of Things (IoT), cloud and edge computing or 5G networks. Applied for the trucks, vans or buses, these technologies offer an integrated view for fleet managers in terms of road optimization, fuel consumption, drivers behaviors, and also they enable the data collection for smart cities projects for a cleaner and safer mobility.

Vehicles are more and more connected to the digital environment. Connected tires represent another example, no matter they are integrated in fleet management systems or analyzed as unique features. The vehicle manufacturers and also the fleets started to test, pilot and apply systematically the intelligent sensors that permit to get information from the tire and to translate it in efficiency and environmental metrics and insights. Thanks to these intelligent sensors, the tire pressure real time monitoring tool gives data about the impact that the wrong pressure has on the fuel consumption. This is analyzed not only from the costs perspective, but also from the sustainability angle, the fuel savings being translated in the equivalent of CO₂ emissions reduction. Developments are ongoing to collect more data from transportation's assets impacting sustainability, such as tire wear, vehicle load or particles emissions.

Challenges in scaling technologies for a more sustainable transportation

Even though this type of technologies as Fuel Cell (Hydrogen) are already existing, scaling them is a challenging process, as they require high investments in the infrastructure and also the hydrogen production costs remain significantly high. Moreover, for some critical raw materials such as lithium, nickel, and cobalt needed to produce this newer types of technologies, it is very challenging to assure a lean supply chain, at the right capacity. On top of the vehicle features, telematics represent a set of technologies used today at quite a large scale by commercial fleets. Telematics allow to track fleets' assets in real time, to optimize the workflow and the whole fleet management, better leveraging costs versus profitability. At a higher level, when referring to the public transportation and the ambitions to have smart cities, lots of data are already transmitted thanks to technologies such as machine learning and artificial intelligence. All these technologies mentioned above aim to enable sustainable mobility, for smart cities and tomorrow's logistics operations. While transportation industry started to make progress based on data and actionable insights about how to save fuel, there is still a gap between the stated objective to contribute to a greener transportation and the reality on the roads. Even though the technologies exist today, the challenge is to integrate them, from transporter, to connected assets and data providers. Fleets and data providers need to better articulate and align on their objectives for sustainability. It's critical to clearly define the sustainability's key performance indicators (KPIs) and to have one commonly agreed framework to measure them. The observations on fleets reveal that most of them started to look closely at the CO₂ emissions reductions and safety improvement as key indicators, but without having much understanding about how to define and measure them.

From purely digital technologies perspective, there is still important progress to be done, starting with the creation of an environment that could allow optimal usage of the newest technologies such as cloud-edge computing processing huge amounts of data in real time, 5G connectivity ensuring high speed and reliable data transfer, AI and robotics, chips for smart vehicles, and new kinds of automotive operating systems. Next to the financial investments required to create and maintain these platforms, there is also the human resources preparation needed for an efficient usage of all these insights and data.

Only a well trained staff can track sustainable KPIs in a consistent way over time, extract the value from all these new technologies and put them at the service of sustainability and business growth.

Moving borders for the transportation industry

Known rather as a moderate pace transformation industry, transportation is today more dynamic than ever, under the pressure of both total cost of ownership reduction but also of sustainability's targets and regulations. New players try to aggressively enter in the market, especially in the electric vehicles field. In parallel, the traditional vehicles makers started to develop new technologies driven by innovation and sustainability. Regardless of the areas, vehicles or fleet management, we assist to the raise of new players everywhere, the border between tech and automotive overlapping constantly.

New entrants compete mainly in the EV vehicles area, while the incumbents put significant investments in technology or venturing with tech companies to cover their existing gap. Technological and digital innovations bring already value to the fleets in many aspects, such as road optimization which translates in mileage efficiency, costs reduction, increased uptime. However, when referring to sustainability there are still significant challenges. Figure 1 below shows the main aspects considered and evaluated by fleets in their decarbonization journey. From the type of vehicle (the main asset of a fleet) to the energy efficiency or infrastructure development, all the elements are correlated and should converge towards the central interest of the fleet: the performance. The daily reality of transportation industry shows that sustainability is often addressed in its relationship to costs and business results. Consequently, it's important to treat them in conjunction and consider their consolidated impact.

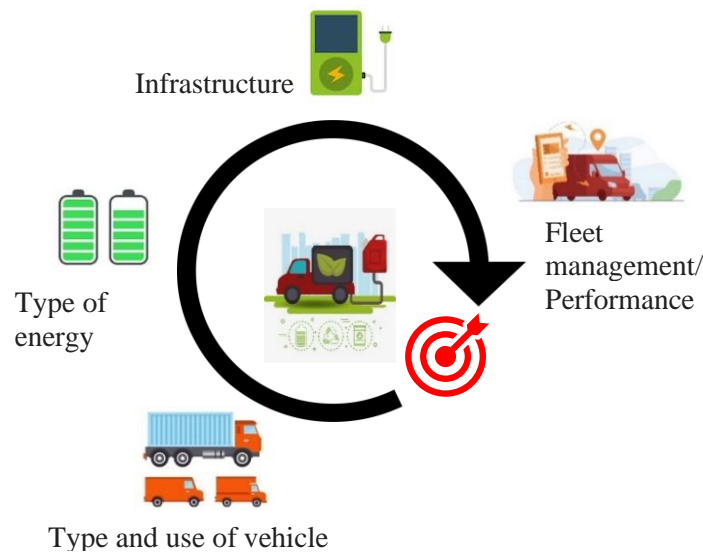


Figure 1. Key interest elements for fleets in the decarbonization journey

Under the time's and regulations' increasing pressure to switch towards more sustainable operations, the fleets managers still have to secure the assets and to reduce their costs for more productivity. These two factors are critical for ensuring the business continuity and they remain very important for the fleets also during their decarbonization journey. Those technologies that will succeed to enable the business performance together with more sustainable operations will be the winning ones. The implementation of the new technologies will have an in-depth impact on the fleets, as they will need to adapt or to completely build new ways of operating, from systems to well-trained human resources, able to manage and optimize these tools. On top, the path towards electrification hides also significant risks for the fleets business, in terms of choosing the right suppliers and secure profitable partnerships, among all the new and traditional vehicles makers. Fleet managers are tested now on their ability to make the right decisions in an uncertain context and based on a reduced amount of accurate information.

Conclusions and future insights

Many key players in the transportation industry are already on the road towards sustainability, aware that it's the right direction for the future. However, this is not a straight paved line. The journey to become sustainable is an winding road, that authorities, business and society need to consolidate now in order to preserve the world as it is, for the future generations.

Transportation industry, recognized as having a significant impact on the environment, is actually responsible as a whole of around 20% of the global CO₂ emissions, according to a research realized by Shell in collaboration with Deloitte. On one hand, the fleet management remains more than ever focused on the costs reduction, especially in the current economic environment, still recovering after Covid-19 impact and under historic inflation increase rate. However, on the other hand, it's crucial for fleets to adopt and use the new technologies in an effective way, to make significant steps towards a green business. Decarbonization represents a top priority for most of the fleets but many progresses are still to be done, one of the main challenges being the data accuracy in measuring and benchmarking the results. Fleets' employees driving this transition, such as purchasing staff, technical engineers and fleet managers work to understand the exhaustive direct and indirect impact of their fleets on the environment, following the scope 1, 2 and 3 of the carbon emissions frame. The pace of decarbonization process is fluctuant, by country and business maturity, but the transportation business moves into this direction, whether it is switching already to the electric vehicles or using transitional fuel. While the path forward is clear, the biggest question mark now is about the rapidity of finding a viable business model in the new context. Based on my direct observations of fleets actions and statements, there is a strong willingness to become greener, but also a lot of uncertainty about how to get there in an effective way for the business.

Most of the big players in the transportation industry have already defined their sustainability's goals and they are fine-tuning now the strategies to reach them. At this stage of the decarbonization journey, as revealed by the current researches on the topic, the fleets need solid and trustful partners, to work together on the sustainability's road map. Establishing strong partnerships will be a key condition to take advantage of the main technologies that would bring value to the transportation businesses, while also supporting them to become greener. Today, players from various industries such as spare parts suppliers, EV constructors, high tech companies, incumbents and start-ups, as well as private, public and even NGOs sectors join their know-how and resources to implement effective solutions on the net-zero carbon emissions roadmap. These partnerships are critical to advance and differentiate, especially in the transportation industry, in the context of strict regulations, time pressure and strong competition. The fleets and their partners work both to the strategic framework and to the in-depth operational aspects. They look to identify any feature or component of mobility that impacts sustainability. Then, using fine-tuned technological tools and methods, the objective is to have a positive impact on various sustainability's aspects such as: reducing the CO₂ emissions, improving the road safety, cutting the waste especially in production phase and ensuring recyclability, to build the circular economy.

Digitalization and sustainability are no longer just some trends, they clearly are a mandatory part of our daily lives and also of business models. They should go hand in hand and reinforce each other to innovate, for preserving the world and life for the future generations, the end-purpose of sustainability.

References

- [1] European Commission, Mobility Strategy, July 2021, *A fundamental transport transformation: Commission presents its plan for green, smart and affordable mobility*
- [2] White paper, Bridgestone EMIA, Dec 2022, *Our integrated approach towards electric vehicles*
- [3] EU agenda, March 2022, *Greening and Digitalization of Transport*
- [4] Mc Kinsey, December 2022, *Getting to carbon-free commercial fleets*
- [5] Mc Kinsey, December 2022, *Fleet decarbonization: Operationalizing the transition*
- [6] Shell & Deloitte, 2022, *Navigating fleet decarbonization: a guide to driving a successful transition*