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D. 2.1

Future challenges for SMEs in automotive, transport and mobility vehicle production and their manufacturing suppliers

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Executive Summary

This deliverable aims to introduce the main trends and challenges that will shape the Mobility, Transport and Automotive ecosystem in the future. This global vision will be relevant for all the organizations working in the mobility value chain, so they can analyse and rethink their business model as well as design adapted strategies that can guarantee their competitiveness and survival in the market.

On the other hand, the deliverable will give a step forward highlighting the expected impact of these future trends on SMEs working in the MTA ecosystem, our main target group, so the consortium partners can better understand their main difficulties and needs, as well as their strategic priorities. This way they could be better guided in their twin transition process and towards a greater level of resilience.

This report is also a key starting point for the right development of the RESIST Eurocluster initiative, as the results of this study will conform the baseline for the launch of the rest of the project activities and services provided.

1. Introduction

1.1 Purpose of Document

This document has a double objective:

On one hand, to provide a general overview on the main trends and challenges that will affect the Mobility, Transport and Automotive sector in the future, covering even topics which will arise in the next decade.

On the other hand, to analyse the impact of these trends on SMEs working in our ecosystem, so we can understand better their situation, their main needs and concerns, as well as identifying their priority objectives.

All the information gathered in this study will be considered as a key starting point in the organization and development of the rest of activities planned to be launched in the framework of the RESIST Eurocluster initiative, aimed at supporting the twin transition and increasing the level of resilience of SMEs.

1.2 Intended audience

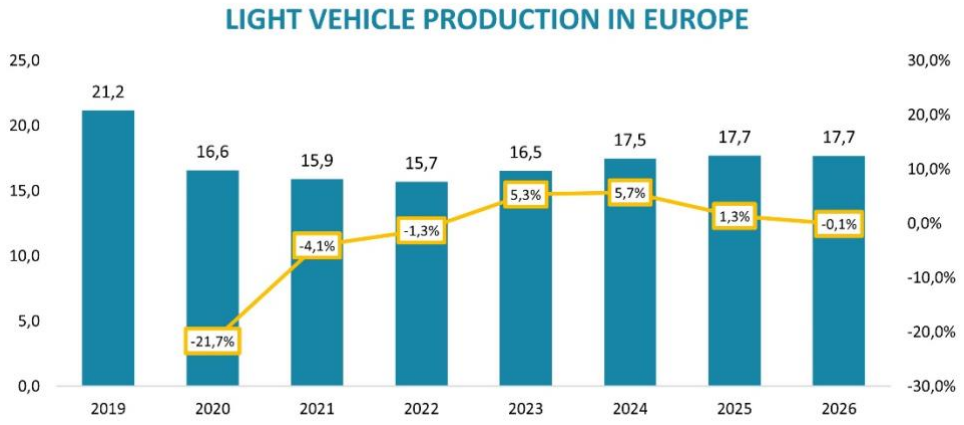
This deliverable is mainly addressed to the following audience:

- The consortium partners, so they can understand better the main future challenges in the Mobility, Transport and Automotive ecosystem and their impact on SMEs, a valuable information that will allow them to provide the right support to these companies in the framework of the RESIST project activities.
- Clusters, relevant associations, companies, and any other stakeholder working in our target ecosystem or with interest in the involved sectors, so they can access to the main conclusions of our report, send contributions or identify collaboration opportunities or synergies within the scope and objectives of the RESIST initiative.
- Our project officer in the European Commission, to review that this deliverable contains the main aspects to be covered and fulfils the objectives established in the RESIST proposal.

2. Background: The Mobility, Transport and Automotive (MTA) ecosystem in a VUCA environment

The mobility ecosystem defined in the EU Industrial Strategy covers the entire industrial value chain for automotive, rail and waterborne industries as well as associated retail and water and land transport services. It employs 14.6 million people and represents 7.5% of EU value added (EUR 906 billion). It includes 1.8 million firms, 99.7% of which are SMEs.

The European automotive industry already faced multiple challenges before the arrival of the Covid-19 pandemic crisis, such as the electrification and automatization of vehicles, changes in the mobility consumer behaviour (especially among young people), the strong need for digital transformation in the manufacturing processes or the high level of investments required to fulfil the strict vehicle emissions regulations at European level. These challenges are now topped by the impacts of the sanitary crisis and the Russian invasion to Ukraine that has led to reduced production volumes (2022 was the third consecutive year with volumes below pre-pandemic levels and the long-term forecasts, although with increasing volumes are still below the 2019 figures), unpredictable production cycles, exploding prices for raw materials, parts, energy, or transport, and foreseeable increases of salaries, putting automotive suppliers with their low margins in danger.



Source: own elaboration based on S&P global light vehicle production forecasts

Figure 1: Impact of crisis in the European production volumes

The High-Level Group GEAR 2030 report on the competitiveness and sustainable growth of the automotive industry in the EU had already issued in 2017 recommendations on how the industry could anticipate and adapt to current trends - thereby turning short- to medium-term threats into long-term opportunities. Later, in September 2022, the European Automotive Cluster Network (EACN), with 26 automotive and mobility clusters as members, warned about the increasing fragility of automotive suppliers and the need to implement urgent measures to save the ecosystem, such as:

1. Re-examine and adapt existing contracts.
2. Include more flexibility in future contracts in the short-term.
3. Create long-lasting partnerships (involving suppliers) at European level.
4. Review our current purchasing system, so we can move from a global towards a “made in Europe” strategy, with parts coming from European suppliers and raw materials issued from recycled materials wherever possible.

The transportation sector was also hardly affected by the coronavirus pandemic. As stated in the Commission staff working document “For a resilient, innovative, sustainable, and digital mobility ecosystem. Scenarios for a transition pathway”, the crisis triggered a drop in rail transport volumes (-6% for freight in tonne-kilometres and -46% for passengers in passenger-kilometres), leading to postponements and cancellations of orders, as well as a lower services volume. On the other hand, European shipyards were extremely hit (90% of decline in new orders in terms of Compensated Gross Tonnes (CGT), due mainly to the sharp drop in cruise ship orders). The lower economic impact in Asia (for being less concentrated on specific market segments) together with the enormous stimulus packages provided by their governments, affected very negatively the EU shipbuilding activity, which reduced its market share to less than 5%.

In October 2019, the European Commission Expert Group on the Rail Supply Industry (RSI) endorsed a report with a series of recommendations on measures needed to sustain and develop the RSI in the medium term.

On the other hand, The NAIADES III action plan, adopted on 24 June 2021, tables a 35-point action plan to boost the role of inland waterway transport in our mobility and logistics systems. The core objectives are to shift more cargo over Europe's rivers and canals and facilitate the transition to zero-emission vessels by 2050.

The crisis has also shown the essential role played by transport and the social, health and economic costs when free movement of people, goods and services is severely constrained. The preservation of supply chains and a coordinated European approach to connectivity and transport activity are essential to overcome any crisis and strengthen the EU’s strategic autonomy and resilience.

According to the report “Sustainable and Smart Mobility Strategy – putting European transport on track for the future” presented by the European Commission in 2020, the most serious challenge facing the transport sector is to significantly reduce its emissions and become more sustainable. Given its high proportion of total EU greenhouse gas emissions, the EU’s goal of at least -55% greenhouse gas reduction target by 2030 and of climate neutrality by 2050 will be reached, only by introducing more ambitious policies to reduce transport’s reliance on fossil fuels without delay and in synergy with zero pollution efforts.

Moreover, mobility in Europe should be based on an efficient and interconnected multimodal transport system, for both passengers and freight, enhanced by an affordable high-speed rail network, by abundant recharging and refuelling infrastructure for zero-emission vehicles and supply of renewable and low-carbon fuels, by cleaner and more active mobility in greener cities that contribute to the good health and wellbeing of their citizens.

Anyway, all three components of the ecosystem face the same challenges in terms of decarbonisation, digitalisation, and global competition. But in the current VUCA environment, we should analyse in more detail each one of the main trends and specific facts that will affect the MTA ecosystem in the future, to understand better how we could address the support to these European value chains and to the related companies (especially SMEs) in the framework of the RESIST Eurocluster initiative. This is the main objective of this report.

3. Identifying the main future challenges in the MTA ecosystem

3.1 Planning and methodology used in this study

To carry out this study, a step-by-step methodology, progressively opened to different relevant stakeholders, was considered, as it is illustrated in the following chart:

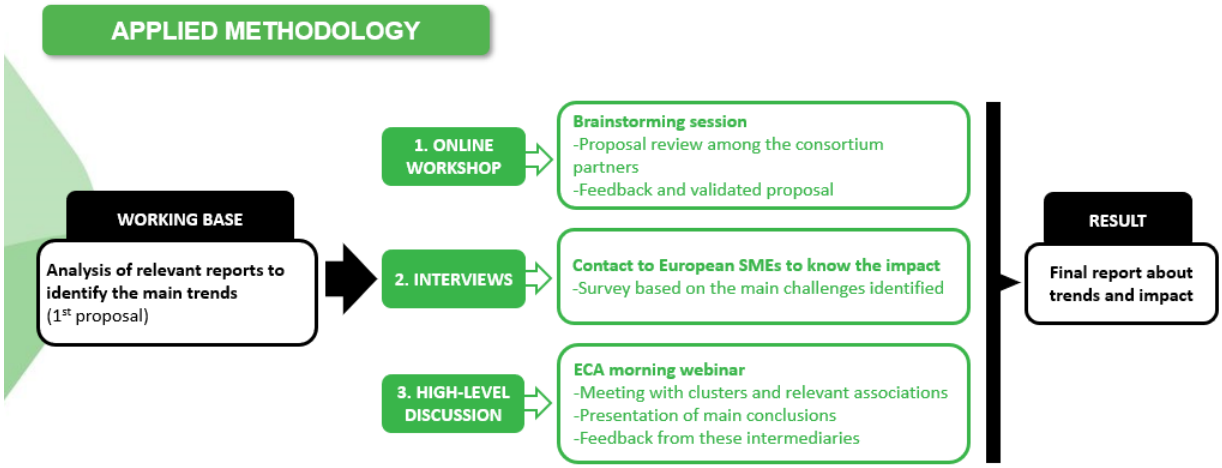


Figure 2: Methodology used to carry out the trends analysis

0. First proposal of trends (working base): The starting point was to look for studies, research documents, reports and any publication focused on the sectors involved within the Mobility, Transport and Automotive ecosystem. This search was mainly carried oud by CEAGA, leader of the task 2.1, using appropriate keywords in the web, although the contribution from other consortium partners was also considered. Additionally, and taking advantage of the existing collaboration agreement between the Gartner consulting company and the Galician development agency (IGAPE), which allowed Galician clusters like CEAGA to have access to their services, we could receive additional research on the field. CEAGA reviewed all the relevant bibliography and prepared a first draft with the main trends identified, that were organized around 7 areas: social and talent; technological; economic and business; geopolitical; green transformation; energy; and value chain.

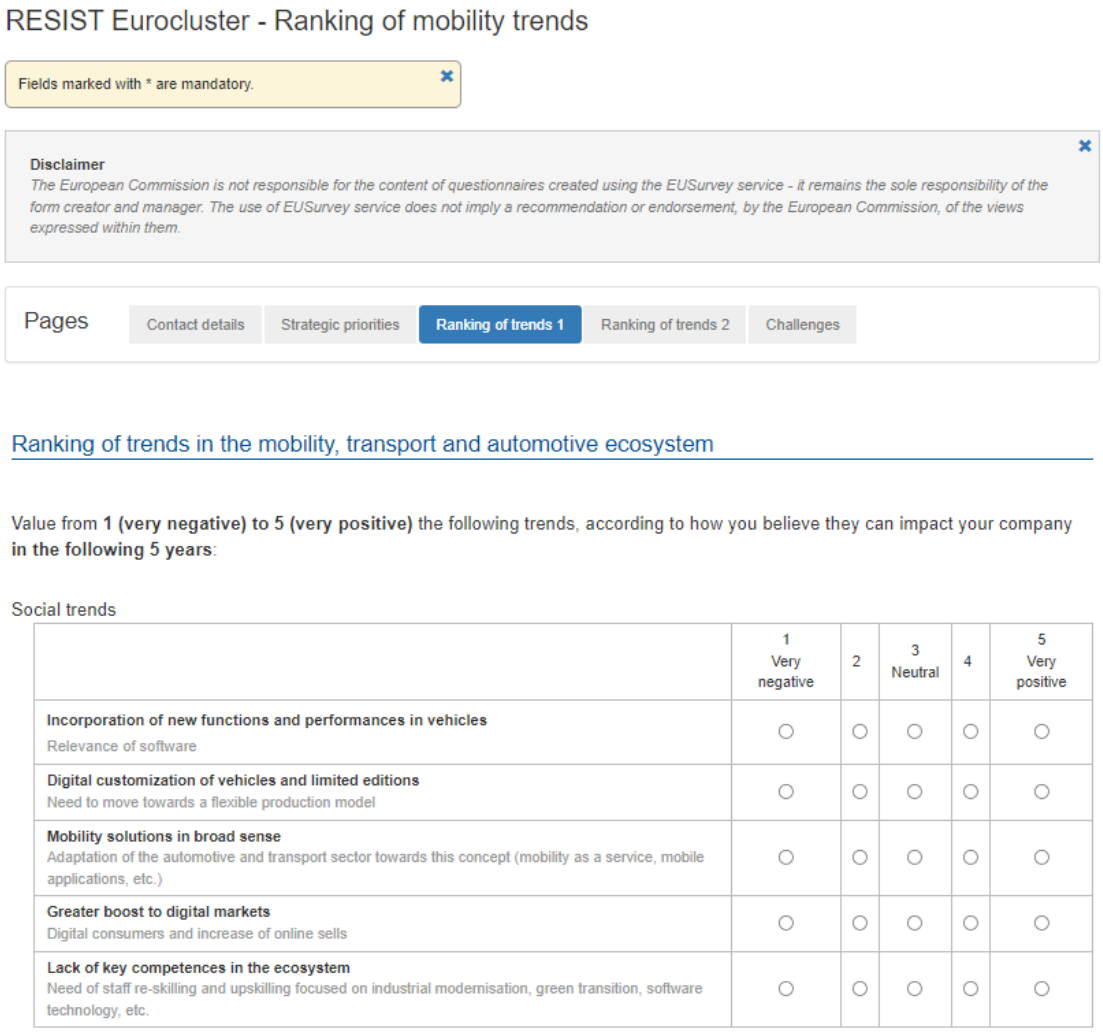
   Later, this proposal was reviewed and discussed, in the framework of two online meetings, with Pedro Pacheco, Gartner expert in the automotive industry, with special focus in C.A.S.E mobility (Connected Car, Autonomous Drive, Services and Electric Drive).

1. Internal discussion with the rest of the consortium partners: In the framework of an online workshop which took place last 16th of November, the result from the previous phase was presented to the RESIST consortium for its revision and validation.

   The rest of the partners could also contribute to the analysis with additional trends not included in the CEAGA's initial proposal, such as:

   - The multicriteria analysis simulation in the technological field.
   - The European legislative framework driving the sustainable transition, such as the Green Deal or the new Euro 7 standards.
   - Relevant skills such as bioengineering or raw materials bio-sourcing, that will be required in terms of green transformation.

2. Survey to SMEs: Once the consortium reached an agreement on the main future trends, CEAGA prepared a survey addressed to SMEs (accessible in the following link: https://ec.europa.eu/eusurvey/runner/RESISTeuroclusterTRENDS#page0) to analyse the impact of each of these challenges on them. In this sense, it was important not only to measure how important the effect on SMEs was (ranking from low to high relevance), but also the grade of this impact (positive or negative). Apart from their ranking of trends, companies were also asked for their contact details, strategic priorities, and main challenges.



RESIST Eurocluster - Ranking of mobility trends

Fields marked with * are mandatory.

Disclaimer

The European Commission is not responsible for the content of questionnaires created using the EUSurvey service - it remains the sole responsibility of the form creator and manager. The use of EUSurvey service does not imply a recommendation or endorsement, by the European Commission, of the views expressed within them.

Pages: Contact details | Strategic priorities | Ranking of trends 1 | Ranking of trends 2 | Challenges

Ranking of trends in the mobility, transport and automotive ecosystem

Value from **1 (very negative) to 5 (very positive)** the following trends, according to how you believe they can impact your company **in the following 5 years**:

Social trends

	1 Very negative	2	3 Neutral	4	5 Very positive
Incorporation of new functions and performances in vehicles Relevance of software	○	○	○	○	○
Digital customization of vehicles and limited editions Need to move towards a flexible production model	○	○	○	○	○
Mobility solutions in broad sense Adaptation of the automotive and transport sector towards this concept (mobility as a service, mobile applications, etc.)	○	○	○	○	○
Greater boost to digital markets Digital consumers and increase of online sells	○	○	○	○	○
Lack of key competences in the ecosystem Need of staff re-skilling and upskilling focused on industrial modernisation, green transition, software technology, etc.	○	○	○	○	○

Figure 3: Screenshot of part of the trends survey

Although this questionnaire was initially sent just to SMEs, we finally decided to open access also to clusters or relevant associations in order to receive more answers. These organizations could thus contribute to the analysis with a general vision about the situation of their members and how the future market evolution could affect them.

The results of the survey will be deeply presented in the chapter 4 of this deliverable.

3. High-level discussion: To end-up this analysis, the RESIST consortium invited clusters, relevant associations and companies working at the Mobility, Transport and Automotive ecosystem, as well as any other stakeholders with interest in the project, to attend a high-level discussion organized last 9th of February. This online event, organized in collaboration with the European Cluster Alliance, aimed to introduce the RESIST Eurocluster initiative, as well as to present the main conclusions about our trends analysis (including the main challenges identified and the results of the survey).

Figure 4: Photo taken during the "new trends in mobility" webinar

Figure 5: Agenda of the webinar

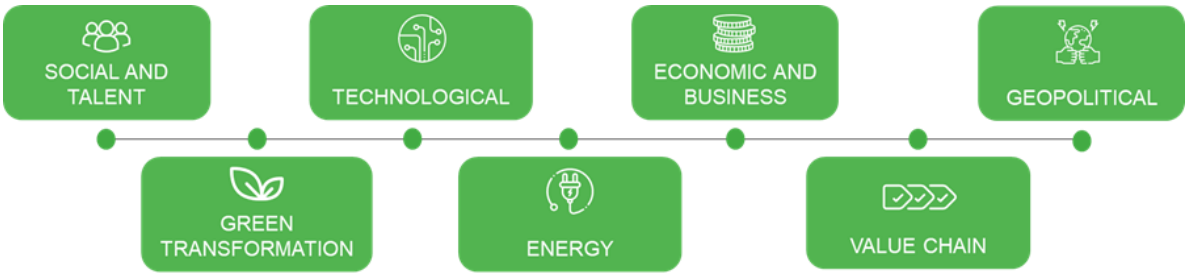
The information provided generated great interest among the near 40 representatives which attended this webinar, who could also give feedback and contribute to our trends mapping. The full video of the webinar can be seen at the following link: https://youtu.be/Ie79XNRP05o

3.2 Main future trends and challenges identified

In the following pages, we will present the main trends that, in the opinion of the RESIST consortium and based on relevant studies and experts, will drive the mobility, transport and automotive ecosystem in the future. Most of them will already have their effect this decade but others could gain more prominence in the next decade.

Nevertheless, it should be noticed that the predictions related to these trends may not be wholly accurate, as unforeseen events could result in altered courses of history.

The main trends identified were classified around the following areas:



Each of these areas of analysis will be covered in more detail in the next sections.

3.2.1 Social and talent trends

Generation Z on the rise: The next decade will be marked by the maturation of Generation Z. According to a recent study by Ernst & Young, Generation Z comprises 1.8 billion people, 24% of the world's population. This group of population will keep on buying cars, but more electric, connected, or autonomous. They will demand new functionalities and better performances on vehicles, that could be incorporated once the vehicle leaves the assembly line, especially via software. They will also be keen on using sharing applications and other mobility alternatives.

Digital customisation of vehicles and limited editions: Automotive companies will tend to offer more personalized vehicles, adjusted to the consumer preferences, for what they will need to move towards a more flexible production system. This customization is intended to be more digital than physical, as the latter implies higher costs and OEMs need to find scale economies, especially with the change from ICE to electric vehicles.

Mobility solutions in broad sense, especially around cities: The increase of population living in urban areas and their extension towards the city outskirts, will force the public transportation network to improve and be broader, offering other solutions apart from regular services, such as on-demand transportation via mobile applications. According to a recent study by the Oliver Wyman Forum and the Institute of Transportation Studies (ITS) at the University of California, Berkeley, Europe mobility revenue will reach $143,9 billion in 2030 from $56,8 billion in 2020, while the Europe's share of the global market will remain around 20%.

We move towards the concept of “mobility as a service”, where a cooperation model between public and shared transport and the data exchange among the whole mobility ecosystem (including vehicles, infrastructures, etc.) will be required. Moreover, mobility solutions will need to be adapted to different target groups. Apart from generation Z, commented before, the increased number of older people and their needs should be addressed in the future, although few companies are thinking about them right now. Autonomous driving, such as robot taxis with no driver required, could be a perfect solution for them, especially in the next decade.

Greater boost to digital markets: According to a survey carried out in 2021 by KPMG to more than 1,000 managers in the automotive sector, 78% of the respondents think that most new cars will be purchased online by 2030. Further, almost half of them believe that at least 60% of new cars will be sold directly by automakers to consumers by 2030. The reason behind that is that the reduction in car sales expected in the next decade, together with the obligation to sell zero emission vehicles from 2035 (like electric vehicles, which have less parts requiring maintenance), will put many authorized dealers and after-sales services in financial difficulties, forcing them to close their business.

Lack of key competences in the ecosystem: The Mobility, Transport and Automotive ecosystem is suffering the lack of qualified personnel, both in terms of quantity and quality. The lack of well-trained drivers in the transportation area, for example, could find a solution with the launch of autonomous operations. On the other hand, there is an urgent need to reskill and upskill the companies’ staff in areas such as industrial modernisation, green transition, software technology, etc.

3.2.2 Technological trends

Connected vehicles and its use as data generators: The information provided by vehicles in almost real time is creating new business relationships in the transportation sector. Those companies with solid data exchange strategies will be in a better position to prosper and could create a barrier for those not well aligned with their partners.

Advance on autonomous driving and transport: New applications will arise, and vehicles will advance towards the level 5 of autonomy. By 2030, autonomous trucks will be used on a larger scale, accounting for more than 10% of new over-the-road heavy truck sales. By 2028, one-fifth of the world's countries will have active regulations allowing production-ready autonomous vehicles to operate legally, up from zero in 2019. To make this possible, new partnerships among OEMs and IT companies or start-ups will be expected.

Electric and zero-emission vehicles: With an expected increase on the sales of this kind of vehicles, automotive suppliers will need to provide with adapted components.

Applied artificial intelligence: To solve classification, prediction, and control problems; automate activities; add/augment capabilities and offerings; and take better decisions.

Industrialized machine learning: Use of software and hardware solutions to accelerate the development and deployment of machine learning and to support performance monitoring, stability, and ongoing improvement.

Advanced connectivity: 5G/6G cellular, wireless low-power networks, low-Earth-orbit satellites and other technologies, will support digital solutions that can drive growth and productivity across industries.

Internet of things and Industrial internet of things: The connection of devices to the Internet to gain information, monitor or control them from a remote location, is a fast-growing business. It can be applied to objects (IoT), like vehicles, to improve the driving experience and get feedback about the use of cars, parts defects and drivers' habits, but it can also be used in industrial environments (IIoT), using smart sensors and actuators to enhance manufacturing processes.

Immersive-reality technologies: Virtual reality (VR), augmented reality (AR) and mixed reality (MR), use sensing technologies and spatial computing to help users to "see the world differently" or "see a different world". They have multiple applications, such as learning, quality control, planning simulation, product cycle and use, etc.

Multicriteria analysis simulation: A process that is worth to explore different alternatives and take better decisions. For example, with the use of digital twins on vehicles, we can gather data from different systems and analyse the use of the vehicle, the parts fatigue, etc.

Cloud and Edge computing: It involves distributing computing workloads across remote data centres and local nodes to improve data sovereignty, autonomy, resource productivity, latency, and security.

Cybersecurity: Key technology to cope with safe data gathering, transfer and processing. In environments where artificial intelligence will allow machines to take decisions and provide changes in production processes, cyber-security is of utmost importance at all levels of the organization.

Use of humanoid robots: Major companies have used robots for decades in manufacturing and nowadays industrial robots are widely employed in several sectors, such as the automotive one. However, the incorporation of humanoid robots in factories to carry out dangerous or tedious labour tasks, could get its relevance at the end of this decade. In fact, Tesla presented its prototype of humanoid robot "Optimus" in September 2022 in the framework of the Tesla's A.I. Day. The robot was work-in-progress but will be mass-produced and put on sale to the public in a few years' time, for less than 20,000 dollars. Other OEMs such as Honda or Toyota, also have solutions in this field.

3D printing: Additive manufacturing technology could have a great market opportunity to answer the need of more personalised vehicles.

Blockchain: This technology, included in our trends report on request of one of the ECA webinar attendants, is a secure, tamperproof, and transparent digital record of transactions among multiple parties, which allows information to be recorded and distributed. Blockchain technology could disrupt the mobility industry, enhancing the traceability in the supply chain, providing solutions for auto insurances or saving personal settings and preferences in car-sharing situations.

3.2.3 Geopolitical trends

Conflicts: The war in Ukraine, the EU restrictive measures against Russia, the Taiwan-China conflict and the new wave of Covid in China have negatively affected the whole European economy and especially the Mobility, Transport and Automotive ecosystem, which has suffered a strong increase of costs and supply problems.

European Union's unity under pressure: The increase on the difference of social classes together with the migration streams, have created an environment of unsatisfied voters that look for stability, job security and social welfare. While populistic parties are making use of this situation, it is not unthinkable that Europe can come back to a more fragmented territory, that could reduce the freedom of movement of goods and people. This could have a negative impact on the economic growth, especially in the European automotive industry that is based on international supply chains.

3.2.4 Economic and business trends

From the "made in China" to the "made in Europe": Chinese vehicles of higher quality are increasing their presence in Europe, and this is a risk for the automotive industry in our region. This also applies to some components that are brought from Asia, so there is a need to relocate the market towards a "Made in Europe" strategy.

Raw materials as key elements in the economy: Those countries with greater access and control over raw materials and scarce resources, will be in a better strategic position at worldwide level. A good example of that is Lithium, that due to its relevance in the production of batteries for electric vehicles, is expected to be in a global supply shortage.

Globalization and economic dependence: The general trend of being more global has made us more vulnerable. To fight against the dependence of Europe with resources acquired in other regions (especially Asia and USA), it's urgent to implement a strategy that guarantees our autonomy and resilience.

Uncontrolled and generalized price increase: Unexpected events such as the Covid pandemic or the war in Ukraine, have risen the price of raw materials, energy, transport, etc.

Consolidation of companies and new players in the market: We expect to see new mergers and strategic alliances between OEMs, but also with new players entering the market, such as Google, Apple, etc.

Difficulty of suppliers to answer future challenges: The need to incorporate digital technologies (especially via software) in products, to meet OEMs and customer expectations, the reduction expected in car sales in the next decade and also the move towards the sale of zero emission vehicles, will put component suppliers in big difficulties.

Embracing agility and digital visibility of value chains: Companies (and specially SMEs) should champion agility not only in manufacturing and operations goals, but also in their business mindset. They should escape from the previous traditional status quo and embrace agility to exhibit fluidity as a small business. For this aim, companies are starting to invest in solutions, such as open data ecosystems, to provide a higher visibility of the whole value chain (including suppliers and customers).

Employee policies & workplaces: Especially since the covid pandemic, the combination of presential and remote working, has been extended. The working model and the grade of flexibility of a company will depend on the market and how they interact with their customers. This trend will have implications on mobility; if workers travel less kilometres, they will extend the life of their own vehicles, negatively affecting new car sales.

New era of opportunities for entrepreneurs: This is especially being promoted with the existence of business incubators, accelerators, and dedicated EU programmes, such as the European business exchange program (that promotes the collaboration between SMEs and young entrepreneurs).

3.2.5 Green transformation trends

Decarbonization of business models: New carbon removal solutions are emerging for decarbonizing business models, driving long term value, and demonstrating climate leadership. In this sense, we are already seeing the compromise of companies such as Toyota, to be neutral in CO2 emissions in 2035. Despite that, carbon emissions will be doubled by far from today to 2050, which puts more emphasis in the transport and logistics to reduce emissions.

Move towards a more sustainable consumption: Sustainable consumption involves transforming industrial and individual consumption through technology to address environmental risks, including climate change.

Sustainable logistics and delivery: Sustainability is increasingly a priority for logistics leaders, especially as customers demand a more sustainable delivery, including for example the use of rail.

The rise of circular economy: It is a new production and consumption model based on the principles of reducing, reusing and recycling, extending the product life cycle. According to a survey carried out by Capgemini to more than 1,000 automotive executives in 2022, the deployment of circular economy initiatives has fallen: while 73% of executives agree that a contribution to the circular economy is necessary to achieve long-term financial and competitive objectives, only 53% claim to have a circular economy strategy. However, this is expected to change in the future, or at least in the automotive industry, where important groups such as Renault or Stellantis, have already created their own circular economy companies.

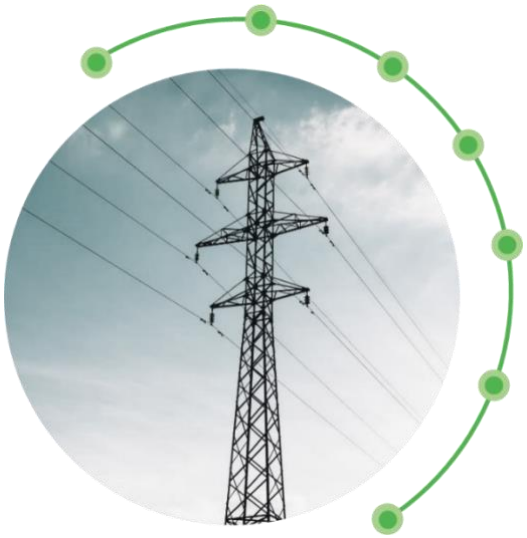
Climate change: Climate-induced changes on Earth are happening faster than we thought. Climate disruptions are causing droughts, water shortages and other natural disasters, aggravating existing social and resource problems.

The legislative framework as the main driver for the green transition: At European level we have the Green Deal which aims to make the EU climate neutral in 2050. Related to the automotive industry, we have the New Euro 7 standards that, from July 2025, will restrict the limit of emissions of vehicles to 60mg/km, forcing companies to make big investments.

Skills required for the green transition: Companies will need experts in areas such as bioengineering, bio sourcing raw materials, product life analysis, etc.

3.2.6 Energy trends

Energy is currently one of the topics of greatest concern among companies. These are the trends identified in this field:



The increase on energy prices will remain unstoppable: Demand will have to adapt to supply. There is a surplus of renewables that are not being spent, so energy companies could offer time slots in which to charge only with renewables and thus adapt the price.

Clean energy: Clean energy solutions may reduce the dependence on fossil fuels and contribute to the reduction of net greenhouse gas emissions throughout the energy value chain, from generation to storage and distribution.

Energy autonomy: Companies will look for self-consumption alternatives, through solar panels, energy accumulators (batteries), biomass waste conversion systems or hydrogen solutions.

Energy flexibility: The capacity of customers to modify their energy consumption. This is commonly seen in big companies, that in exchange for the interruption of their activity on request of energy companies, receive the corresponding payment.

Demand aggregation platforms: In this case, a group of companies or local institutions partner together to buy energy jointly. The aggregated consumption allows them to have more negotiation power in front of energy companies. These platforms act as a marketer of short-term flexible consumption loads, formulating offers of increases or decreases in electricity consumption, guaranteeing energy savings for companies or consumers.

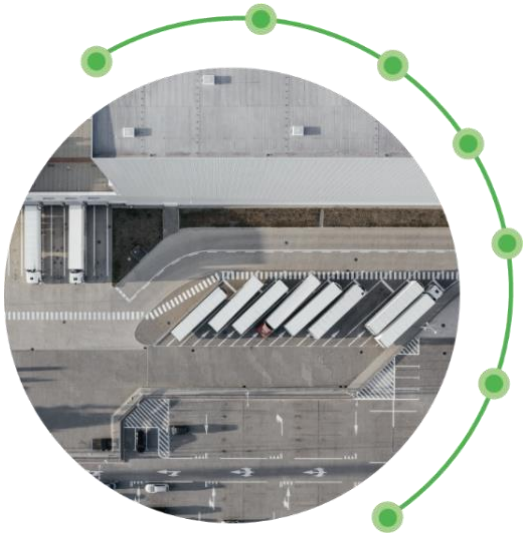
Power Purchasing Agreements: They are long-term bilateral contracts between photovoltaic /wind farms and the industry. This solution is profitable for both parties, as you skip the whole system.

The use of green hydrogen as an energy vector: Hydrogen can be produced from many sources that are available in large quantities on planet Earth: water and electricity, biomass, biogas, natural gas, etc. Among these, several are independent of fossil energies, making hydrogen a sustainable energy vector. Nowadays electrification is much more advanced than hydrogen solutions and OEMs are mainly focusing on electric vehicles, as there will be many possibilities and choices (such as v2g bi-directional charging cars). However, if there were specific grants supporting the use of hydrogen, the strategy chosen by companies could be changed or adapted accordingly.

Energy communities: Legal entities created at local level (composed of companies, public administrations, etc.) that are involved in the production, distribution and use of energy through collective generation plants for shared self-consumption.

Common energy position in Europe: Nowadays the energy market regulations vary depending on the country and there is no consensus at European level in terms of energy policy. To guarantee the competitiveness of our companies, it would be convenient to have a common European position.

3.2.7 Value chain trends



Vulnerable supply chains: The impact of the recent commodity-price volatility on businesses causes uncertainty in value chains. In this VUCA scenario, value chains need to move towards a more integrated and connected business model, so companies can increase their level of resilience against unexpected events.

High dependence on US and Asia in the provision of raw materials and strategic components such as microchips: To face this problem, we expect mergers and strategic alliances (between traditional manufacturers and new players) to strengthen the position of the MTA ecosystem in Europe, together with investments in relevant infrastructures and components, to cover identified gaps in Europe and strengthen our competitiveness position.

Road logistics facing a perfect storm: The lack of personnel, coupled with the negative impact of CO2 emissions from trucks and the high price of oil, may force companies to change from road transportation to other greener transportation modes, or at least use intermodal solutions, where different transportation modes will be connected.

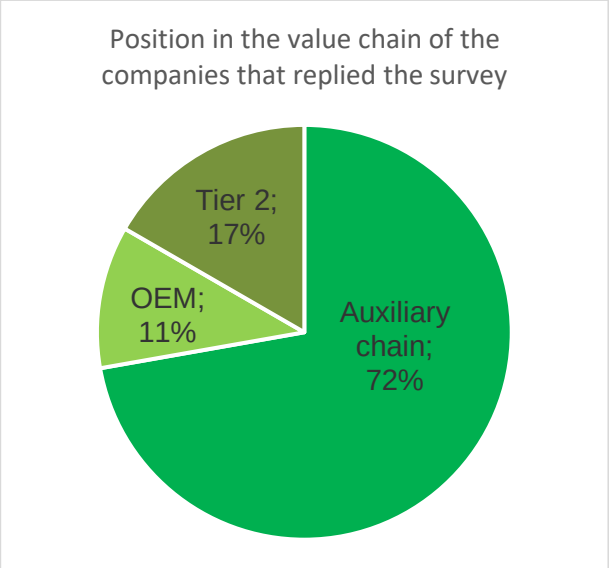
Use of transport visibility platforms: Providing visibility is a fundamental part of supply chain technology and plays a complementary role supporting different supply chain functions such as transport, warehouse, and yard management. It enables logistics managers to understand what is happening inside the organisation, as well as outside, to control end-to-end processes. These solutions can also provide valuable information on the carbon footprint of carriers and highlight areas where carbon emissions can be reduced.

Use of intelligent traffic management systems: These systems capture data in near real time and synchronize traffic lights to manage and improve traffic flow. They incorporate infrastructure sensor data, camera data and vehicle data, together with data on traffic lights and the surrounding environment. ITMS consider aspects of safety, efficiency, vehicle speed, air quality, congestion and vehicle routes.

4. Evaluating the impact of future challenges on SMEs

In December 2022, the RESIST Eurocluster launched a survey to find out the impact of MTA ecosystem trends on European SMEs.

This survey was disseminated on the project's and partners' social media, through the European Clusters Alliance (ECA) and the European Cluster Collaboration Platform (ECCP). During the time it was published, 18 responses were obtained, mainly from clusters and companies in the MTA ecosystem. The fact that clusters replied to the survey gives importance and they represent all their region and know in a broad way the problems companies are experimenting.

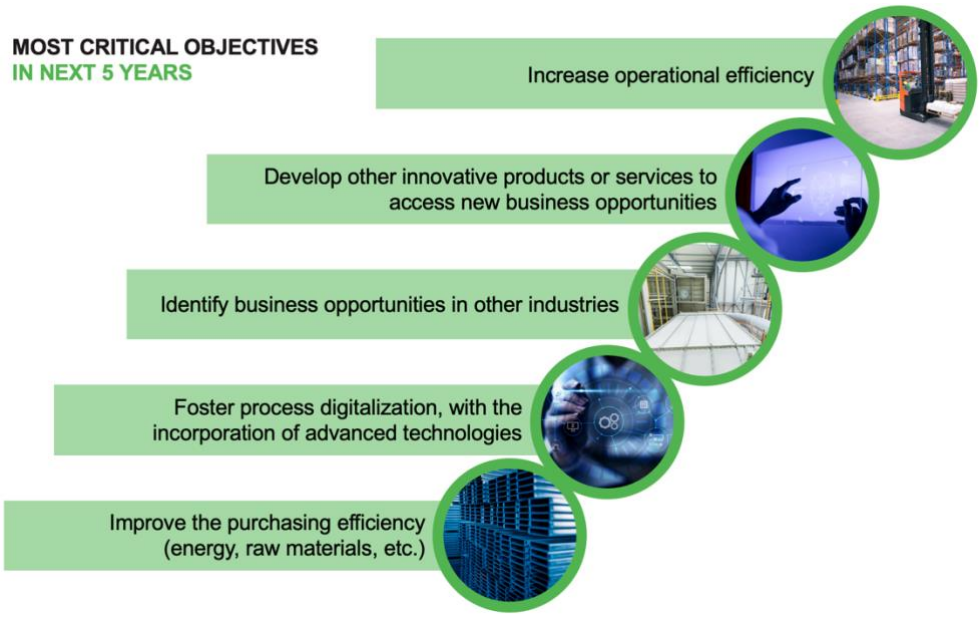


According to the data, 72% of the responding companies belong to the auxiliary chain, 17% are Tier 2, and 11% are OEMs. All these companies come from EU countries such as Austria, Poland, Romania, Spain, France, and Ukraine.

On 9 February 2023, the results of the survey achieved so far were presented in a webinar organised jointly with the ECA in which, in addition, were presented the most critical strategic priorities according to the companies, the ranking of trends divided by thematic areas and the challenges detected.

4.1. Strategic priorities

During the survey, companies could rank the most critical priorities for them in the coming years, valued from 1(more important) to 5 (less important). As a result, the most chosen priorities were selected, and the responses were averaged to obtain the top priorities for the coming years for SMEs in the MTA ecosystem.



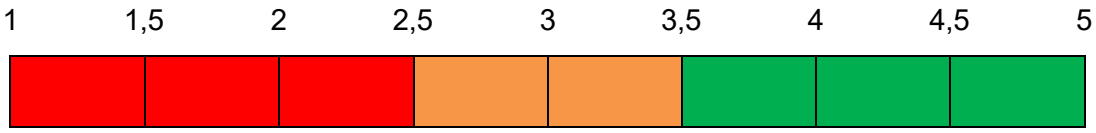
The priority that companies value and are most concerned about is "to increase operational efficiency", followed by "to identify business opportunities in other industries", "to develop other innovative products or services to access new business opportunities", “to increase my customer portfolio within my sector” and in fifth place "to foster process digitalization, with incorporation of advanced technologies”.

As a relevant fact, these priorities match with the other questions of the survey related with trends and the section on challenges that worry companies nowadays.

4.2. Results of the trends survey

To continue, it can be seen a list of every trend that have been questioned in the survey, together with the average score obtained in total. In this section, companies were asked to answer how they think the trends included here will impact their companies, rating them on a scale of 1 to 5, where 1 means it will have a negative impact and 5 means it will have a positive impact.

To visually differentiate the ratings, they have been sorted by score and colour according to this table:



4.2.1 Social trends

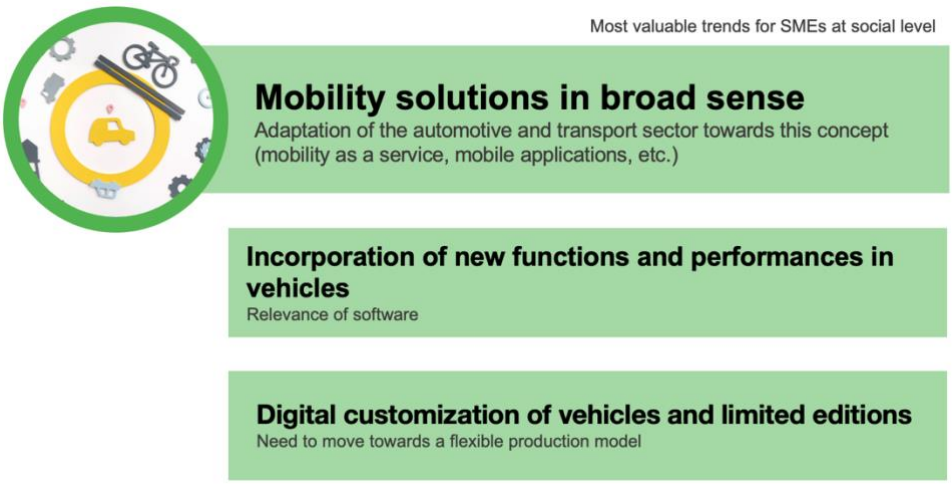
Topic	Ranking of trends
Social	**4,08** - Mobility solutions in broad sense
	3,27 - Incorporation of new functions and performances in vehicles
	3,08 - Digital customization of vehicles and limited editions
	3,00 - Lack of key competences in the ecosystem
	3,00 - Greater boost to digital markets

The trends they value most positively for companies in this area are, in order of rating, “Mobility solutions in broad sense”, “incorporation of new functions and performances in vehicles” and lastly “digital customization on vehicles and limited editions”.

In this area, the scores were very varied and none of the trends received a low average score. However, "Mobility solutions in broad sense" received the highest score with an average of 4 points out of 5.

This topic refers to mobility as a service and the increase of mobile applications in this area, closely related to the rise in the economy of the new generations, as the Gen Z, defined as

people who prefer to use mobile applications in all their aspects of life and new mobility options.

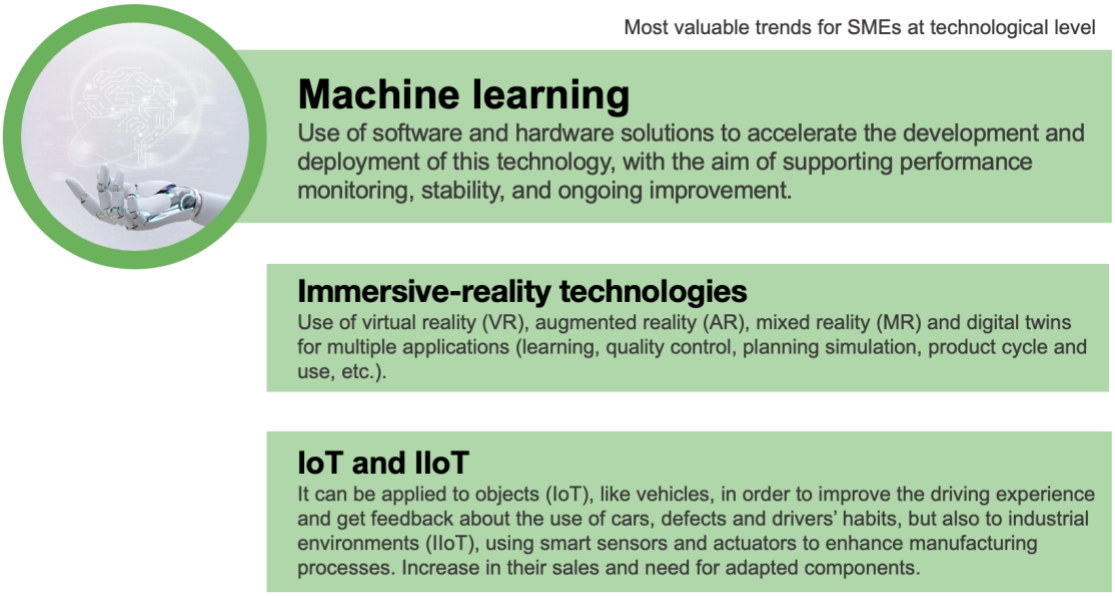


4.2.2 Technological trends

Topic	Ranking of trends
Technological	**4,17** - Machine learning **4,07** - Immersive-reality technologies **3,87** - IoT and IIoT **3,86** - Applied artificial intelligence **3,85** - Engineering simulation multicriteria analysis **3,69** - Cloud and Edge computing **3,65** - Electric and zero-emission vehicles **3,58** - Advanced connectivity 5G/6G **3,54** - 3D printing **3,31** - Production of connected vehicles **3,20** - Use of humanoid robots **3,20** - Cybersecurity **3,00** - Autonomous driving and transport

Moving on to technology trends, something similar happens in scoring. The most valued trend in this case is "Machine learning", followed by "Immersive-reality technologies" and "IoT and IIoT", with a score of 3.87 out of 5.

These three trends mark the need for companies to adapt to new technologies and Industry 4.0 where digitalization is highly significant.



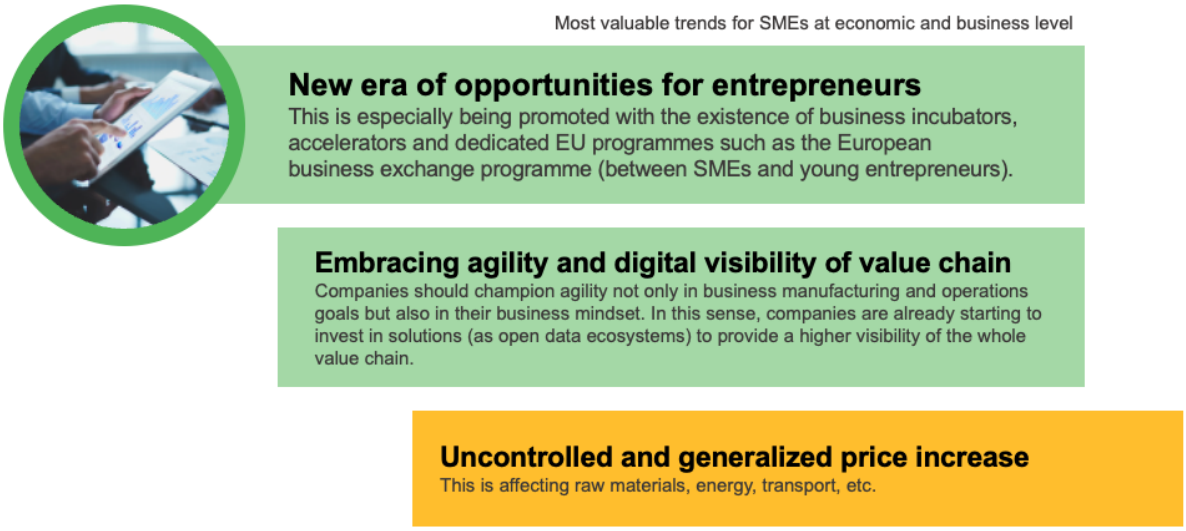
4.2.3 Economic and business trends

Topic	Ranking of trends
Economic and business	**3,87** - New era of opportunities for entrepreneurs **3,73** - Embracing agility and digital visibility of value chain **3,53** - Employee policies & workplaces **2,93** - Consolidation of companies and new players in the market **2,63** - Globalization and economic dependence **2,40** - Big difficulties of suppliers to answer the future challenges **2,36** - "Made in China" **2,14** - Raw materials as key elements in the economy **1,57** - Uncontrolled and generalised price increase

Talking about the economic and business trends, "New era of opportunities for entrepreneurs" and "Embracing agility and digital visibility of the value chain" stand out from the rest of the topics.

These two cases represent the importance of knowing the environment in which they develop, and how companies value the work done by business accelerators for them to launch new products and services.

In this case, the scores obtained make clear which trend will have the most negative impact on the ecosystem: uncontrolled prices of basic materials, energy and transportation, mainly due to the negative situation of war and supply problems.



4.2.4 Value chain trends

Topic	Ranking of trends
Value chain	**3,76** - Use of intelligent transport management systems **3,50** - Use of transport visibility platforms **2,56** - Vulnerable supply chains **2,47** - Road logistics facing a perfect storm **1,56** - Dependence on US and Asia of raw materials and strategic components (such as microchips)

On the other hand, at the mobility, transportation and automotive value chain level, companies highly value the use of intelligent transportation management systems, such as sensors, cameras, and vehicle data to improve the quality of their work. As well as transportation visibility platforms that refer to data control and logistics management improvement.

These two trends reflect a market gap for those companies or start-ups that work on these data management technologies, and again, the importance of digitizing processes and knowing how to work with Big Data.

However, as it was mentioned in the economic and business trends, the dependence on other countries in the demand for materials and components reappears as the most alarming trend.

Most valuable trends for SMEs at value chain level

Use of intelligent transport management systems
They incorporate infrastructure sensor data, camera data and vehicle data, together with data on traffic lights and the surrounding environment, in order to consider aspects such as safety, efficiency, vehicle speed, air quality, congestion and vehicle routes.

Use of transport visibility platforms
To allow logistics manager to control end-to-end processes (transport management, warehouse management, yard management, carbon emissions tracking, etc.)

Dependence on US and Asia of raw materials and strategic components
Need for mergers and strategic alliances to strengthen the position of the MTA ecosystem in Europe, together with investments in relevant infrastructures and components, to cover identified gaps in Europe and strengthen our competitiveness position.

4.2.5 Green trends

Topic	Ranking of trends
Green	**3,75** - Rise of circular economy **3,67** - Move towards a more sustainable consumption **3,31** - Sustainable delivery **3,29** - Decarbonization of business models **2,81** - Legislative framework as the main driver for the green transition **2,53** - Climate change

In the green trends there has been a wide variety of responses that have matched the average for most of the trends asked in the survey.

"Rise of circular economy" and "More sustainable consumption" are the highest scoring categories, closely related to each other and to raw materials management. In the previous trends it was also mentioned the concern about the scarcity of materials, so the correct use and reuse of existing materials are positively value to the members of the ecosystem.

As can be seen in the image, the worst valuable trend in this case is the Climate change and the problems that it may occur if it continues to increase.

Most valuable trends for SMEs at green level

Rise of circular economy

Model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible, thus extending the product life cycle.

Move towards a more sustainable consumption

Both in individual and industrial terms, with the use of technology.

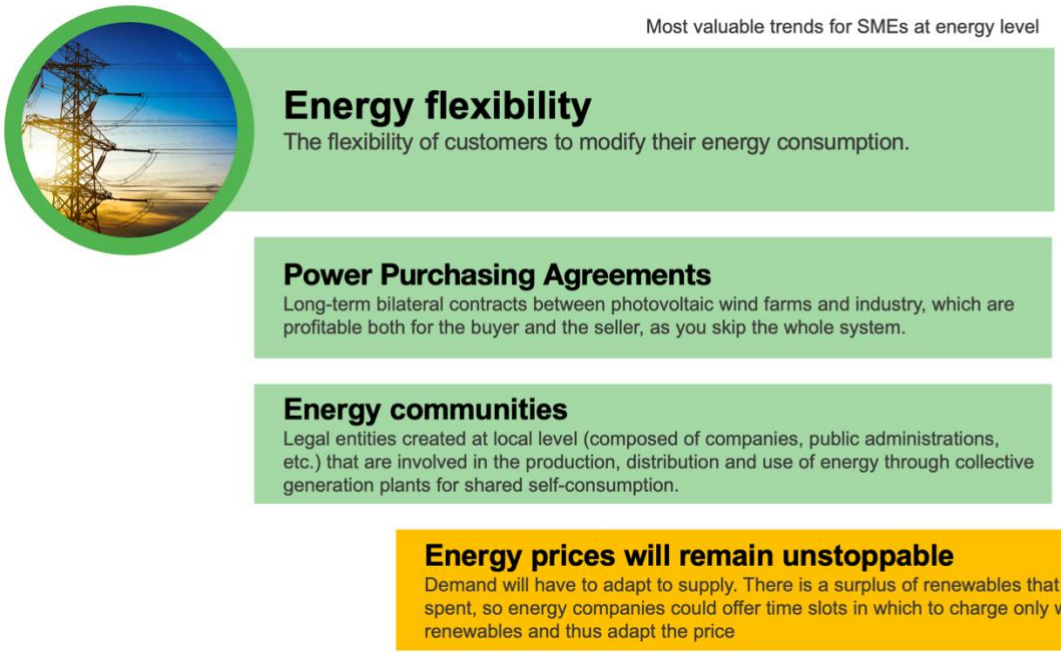
Climate change

It is causing droughts, water shortages and other natural disasters, aggravating existing social and resource problems.

4.2.4 Energy trends

Topic	Ranking of trends
Energy	**3,80** - Energy flexibility **3,77** - Power Purchasing Agreements **3,56** - Energy communities **3,53** - Clean energy **3,50** - Green hydrogen as an energy vector **3,44** - Demand aggregation platforms **3,33** - Energy autonomy in 2025 **2,38** - No consensus at European level in energy policies **2,27** - Energy prices will remain unstoppable

The last of the trends results, the Energy, remarks the three changes that we face in the world right now: the energy prices and the need companies have of choosing when they can modify their consumption, the need of Power Purchasing Agreements and the need of energy communities in their ecosystem. All of them are the best options companies have to fight the increase of energy prices.



4.3. Challenges identified by SMEs

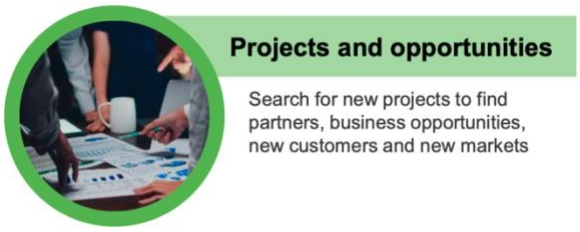
All the challenges that companies have written about have been grouped into four main themes. In the survey, companies had three boxes where they could mention their main problems or needs they have detected. Among all the answers and thanks to the similarity between them, we have been able to group them.

"Training and employability", where we have included all answers referring to the need to attract knowledge and keep the best qualified employees on their own companies.

Some of the answers were: “Maintaining qualified employees”, “availability of qualified employees”, “talents acquisition”, “involvement and knowledge of new hires”, “lack of employees”, or “learning curve”.

Obviously, "Prices and materials" has been one of the most insistent themes, as can be understood throughout the results. The high demand for materials and their low offer, the dependence on other countries such as China and the USA together with rising prices are the most common concerns.

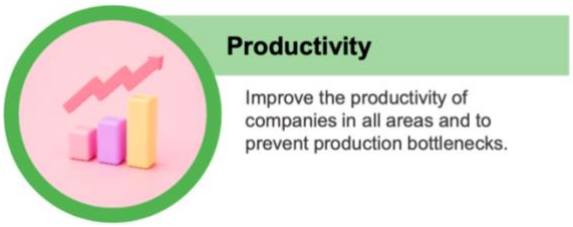
Some of the answers were: “Price increases”, “price speculation on the European steel market”, “tax load”, “reduce costs Electronic components shortage”, “volatility of supply chain and demand”, “raw materials increase”, “rise of costs” or “dependence from other continents regarding material and energy”.



On the other hand, we also got many replies related to the promotion of collaborative projects and expansion into other markets and even industries where companies can develop and look for new customers.

Some of the answers were: “Identify business opportunities in other industries”, “find R&D partners or companies to form consortiums”, “new customers”, “open to new markets or countries”, “new projects in UE”, “digitalisation” “consolidation of companies in the market” and “increase destination sectors”.

And finally, “Productivity and production effectiveness” has been one of the most repeated topics. Companies are interested in finding ways to increase their production in all areas, especially to expand into new markets and avoid bottlenecks in their management that may lead to the interruption of their work.



Some of the answers were: “Productivity”, “administrative procedure problems”, “slowness of the European Union”, “increase productivity”, “lack of visibility of OEMs in short or middle term”, “VUCA environment” or “increase efficiency in all areas”.

5. Conclusions and next steps

The Mobility, Transport and Automotive ecosystem faces important challenges in the future and companies (and especially SMES) should be aware of these trends, adapting accordingly their business model and strategy to the expected market evolution, taking advantage of new opportunities and minimising, or eliminating their main weaknesses or vulnerabilities.

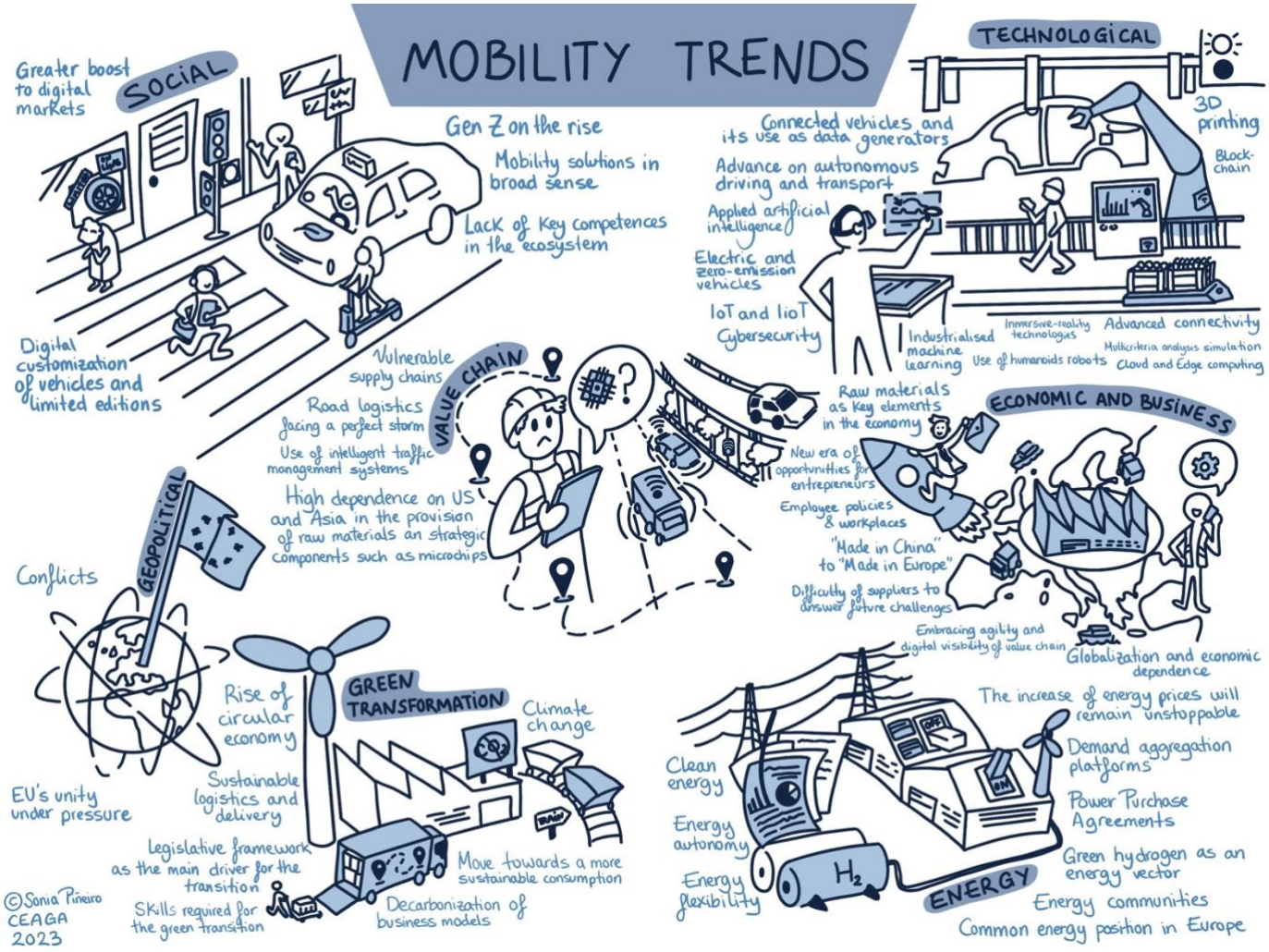


Figure 6: Illustration of the main trends in mobility

The unexpected events derived from the global crisis, have added more pression to the MTA ecosystem, although without changing the already existing technological trends and the main future challenges already on the companies' mindset, such as electric or zero-emission vehicles, autonomous driving or connectivity. However, a strong support is demanded to be given to companies, especially to automotive suppliers that should adapt their products or change their business model to enter these new markets. This is an important big issue if we want to guarantee the competitiveness of the European mobility industry and their survival in this VUCA environment where the price inflation (on raw materials, transportation costs but especially energy) is strangling companies with very low margins.

Industrial modernisation is a "must" priority already included in the strategy of many companies working in our ecosystem, especially in the automotive sector, although the grade of advance in its deployment depends on the kind of companies, being SMEs those that definitely require more support (to understand better the different technologies available, evaluate or find the

best solutions to solve their problems or find the right financial support to carry out the required investments).

However, the whole value chain should give a step forward, keep on advancing in their digitalization pathway, but without forgetting to put the focus on workers, to make these solutions more friendly or helpful for them. In this sense, the concept of human-centricity and the need for reskilling and upskilling the staff in key competences that will be required in the future becomes very relevant. In the framework of the high-level event taken place on the 9th of February we had the opportunity to talk with Jakub Stolfa, President of the Automotive Skills Alliance (ASA), that was attending the event and showed his interest in the RESIST initiative and the possibility to collaborate or share synergies in the training area.

The sustainability objective is another important aspect to be urgently tackled by companies and with no option to skip out on this duty, as the main driver for that seems to be the very strict legislative framework imposed by the European Commission. Different alternatives in the pathway towards green transformation could be considered and it will be very useful to give visibility to good practices from companies that can serve as inspiration to others.

Moreover, all the actors in the value chain should join forces to increase the autonomy and resilience of the European mobility ecosystem, reducing our dependence from external regions and moving towards a “made in Europe” strategy that considers our internal resources and capacities first, relying on European companies wherever is possible. For this aim, the support from the European Commission to provide with the right mechanisms to protect our economy is of key relevance. In this sense, the RESIST initiative is aware about the transition pathway work on mobility carried out by the European Commission and will be willingness to collaborate in the future to exchange our main findings.

With regards to the next steps to be taken within the framework of the RESIST Eurocluster initiative, the results from this report will be considered as a base for the development of other project activities and tasks. A good example of that is the resilience check scheme, a tool that is under development and will be soon made available to companies, so they will be able to audit their market situation, production and processes towards potential risks and future market evolutions, as well as set up an action plan to mitigate those risks. This tool will be a compulsory requirement for being eligible to the different financial calls that will be launched during the RESIST initiative.

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