Capgemini invent

INVENTING THE FUTURE OF SUSTAINABLE MOBILITY:

Driving forces, trends, and scenarios for sustainable mobility towards 2030

CONTENTS

1 INTRODUCTION: INVENTING THE FUTURE OF SUSTAINABLE MOBILITY

The future of mobility is deeply uncertain. How will we move (sustainably) in the future? How local, regional or global will our mobility be? How digital? However, one thing is certain: the mobility of the future must be sustainable. The COP26 summit in Glasgow highlighted, yet again, that the climate crisis requires all of us to find successful long-term answers for the environment. Sustainable mobility plays a central role in this. Sustainability in mobility is not a choice, it is a necessity. To achieve this, we must act – starting today. We need to build a positive, sustainable future of mobility. Strategic Foresight enables us to do just that, by building future-ready strategies that enable us to construct positive futures and to navigate the turbulence on the way. This study on the future of sustainable mobility in Europe as we approach 2030 is a foundation for such strategies, analyzing current, emerging, and future driving forces around sustainable mobility, highlighting trends determining the future of sustainable mobility, and narrating four alternative future worlds of how sustainable mobility could look in 2030. Solving the climate crisis requires us all to contribute. This is why our Strategic Foresight team, the Capgemini Invent Foresight Force, brought together leading sustainability, mobility, and foresight experts, and civil society stakeholders in various foresight workshops and in a "Citizen Lab" at IAA Mobility 2021, the world's largest mobility exhibition. In doing this, we leveraged the Capgemini internal network strength – 290,000 team members in nearly 50 countries, with 120+ nationalities ready to build the future – as well as our extensive external network based on our work with two-thirds of the world´s largest companies across more than 100 countries.

Through our Environmental Sustainability Strategy, Capgemini is building innovative solutions addressing environmental issues within our own business and for our clients. We have committed to help our clients save 10 million tons of CO2 emissions by 2030.[1] Our Strategic Foresight approach contributes to this goal by enabling stakeholders across the private and public sector to get a clear, holistic vision of the future and so to build the world we want and need to see.

LET'S INVENT OUR FUTURE, TODAY!

> We firmly believe that a sustainable future is achievable only with deep industry-wide collaboration with our clients, suppliers, and other stakeholders."

Aiman Ezzat
Group CEO
Capgemini (2021)

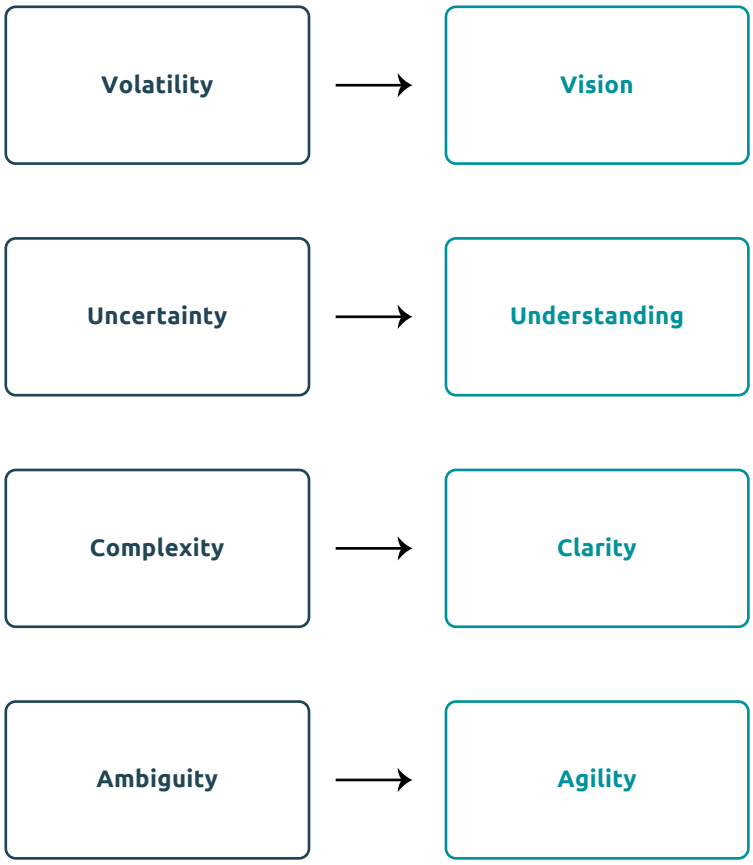
[1] *Capgemini Environmental Sustainability Performance Report 2019/2020, p.6.*

2 WHY, WHAT, AND HOW: RULING THE VUCA WORLD WITH FUTURE-READY STRATEGY THROUGH STRATEGIC FORESIGHT

Why: Today's VUCA world and tomorrow's turbulence

We live in a VUCA world – a world characterized by volatility, uncertainty, complexity, and ambiguity. The exponential speed of change in industries, markets, and the world in general is forcing our hand in everyday decision-making. The lack of reliable knowledge on how the economy, politics, and society will develop is restricting our ability to perceive what's next. The sheer amount of interacting and interdependent factors that need to be taken into account in strategic planning weighs down on any choice about the future. The proliferation, vagueness, and inconclusiveness of concepts and developments around us is submerging us in a fog of indecisiveness. All four VUCA factors create turbulence and disturbances on our journey into the future. In order to achieve a positive future, we must successfully navigate this turbulence. Doing so requires us to come to terms with the VUCA forces around us and to turn them upside down: creating vision from volatility, understanding from uncertainty, clarity from complexity, and agility from ambiguity. To manage this, we need to build future-ready strategies.

Figure 1 Turning VUCA on its head



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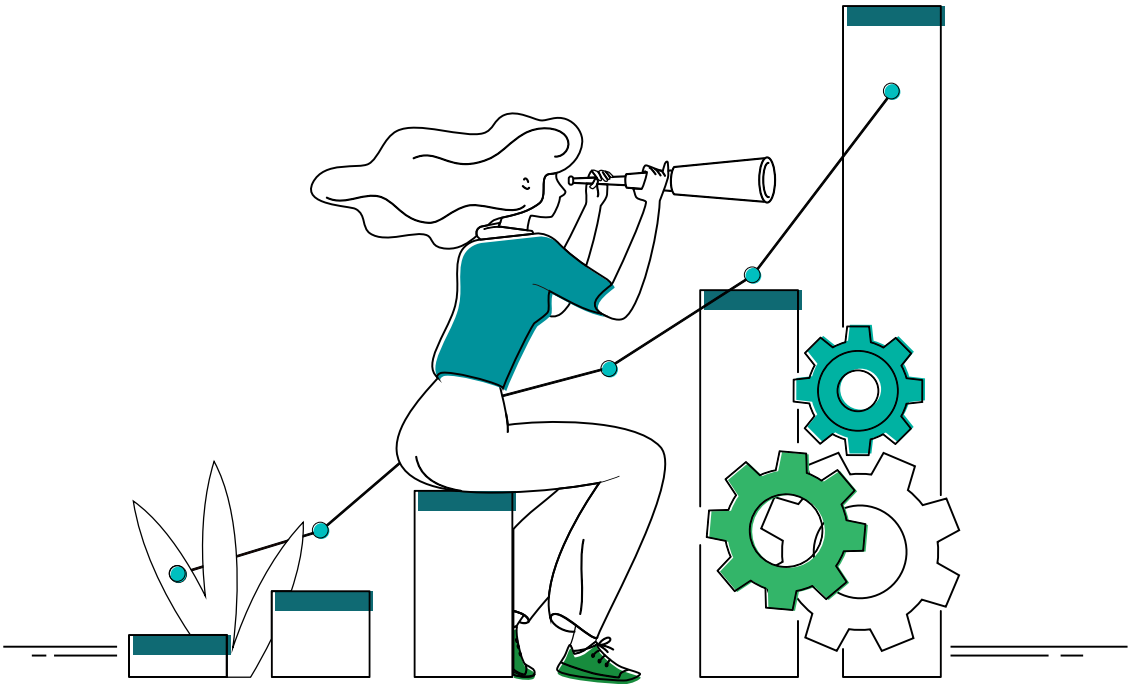

What: Navigating turbulence with future-ready strategy

To anticipate and avoid or overcome these disturbances and instabilities, strategies and policies of private and public sector organizations alike must offer a solid frame for action while allowing room for quick strategic maneuvering within this frame. Conventional strategy methodologies are ill-equipped for this with their backward-focused, linear, blind-spot-prone, and long-drawn-out nature and their inability to capture the multidimensionality of change. To construct future-ready strategies that can tackle turbulence, we need to employ a different kind of thinking from that which conventional strategic planning has to offer. This, of course, does not mean we need to – or should – forget strategic wisdom. However, in order to achieve a solid strategic frame with the flexibility to navigate ever-changing conditions, we need to supplement traditional planning methodologies with forward-thinking ones: Strategic Foresight methodologies.

How: Building future-ready strategy through Strategic Foresight

Strategic Foresight is a structured way of forward-focused strategic thinking that aims to capture the volatility, uncertainty, complexity, and ambiguity of current, emerging, and future developments and to overcome the VUCA nature of the world. Strategic Foresight includes a variety of different methodologies used to anticipate the future and build future-proof strategies, enabling stakeholders to construct a positive tomorrow. While Strategic Foresight contrasts with conventional planning methodologies, it is not new in public or private sector planning. Scenario planning, one of the most prevalent foresight methodologies, first emerged in the context of World War II in military planning.[2] Since then, it has been employed and adapted in the private and public sector context, and the academic field.

Our Capgemini Invent Strategic Foresight portfolio builds on this history adding our own inventive touch. In our foresight approach, we bring together various prevalent Strategic Foresight methodologies: horizon-scanning, trend-sensing, risk- & threat-sensing, scenario planning, threat scenario definition, wildcard mapping, strategic flight testing, and future-ready strategic planning and implementation. With these methodologies, we enable stakeholders to obtain holistic 360° vision on the forces impacting their future. We build on academically rigorous foundations to ensure objectivity and minimize blind spots, employ innovative sensing tools, and bring together leading subject, industry, and foresight experts in our Foresight Force. In doing so, we apply five principles to our foresight work: cherishing diversity in our kaleidoscope thinking, thinking outside in, combining tradition with innovation, our (in)venting approach of leveraging both creativity and positive tension in discussion, and looking backward to see forward. Needless to say, our Foresight Force cannot predict the future – we do not have crystal balls or tarot cards. What we can do is create a picture of the current and future realities we might encounter, and pinpoint the action we need to take today not only to be prepared for future change, but to own it and the transformation that goes along with it.

[2] *Peter Schwartz, The Art of the Long View: Planning for the future in an uncertain world (New York, 1996), p.7.*

Figure 2 **Our Capgemini Invent Strategic Foresight portfolio**

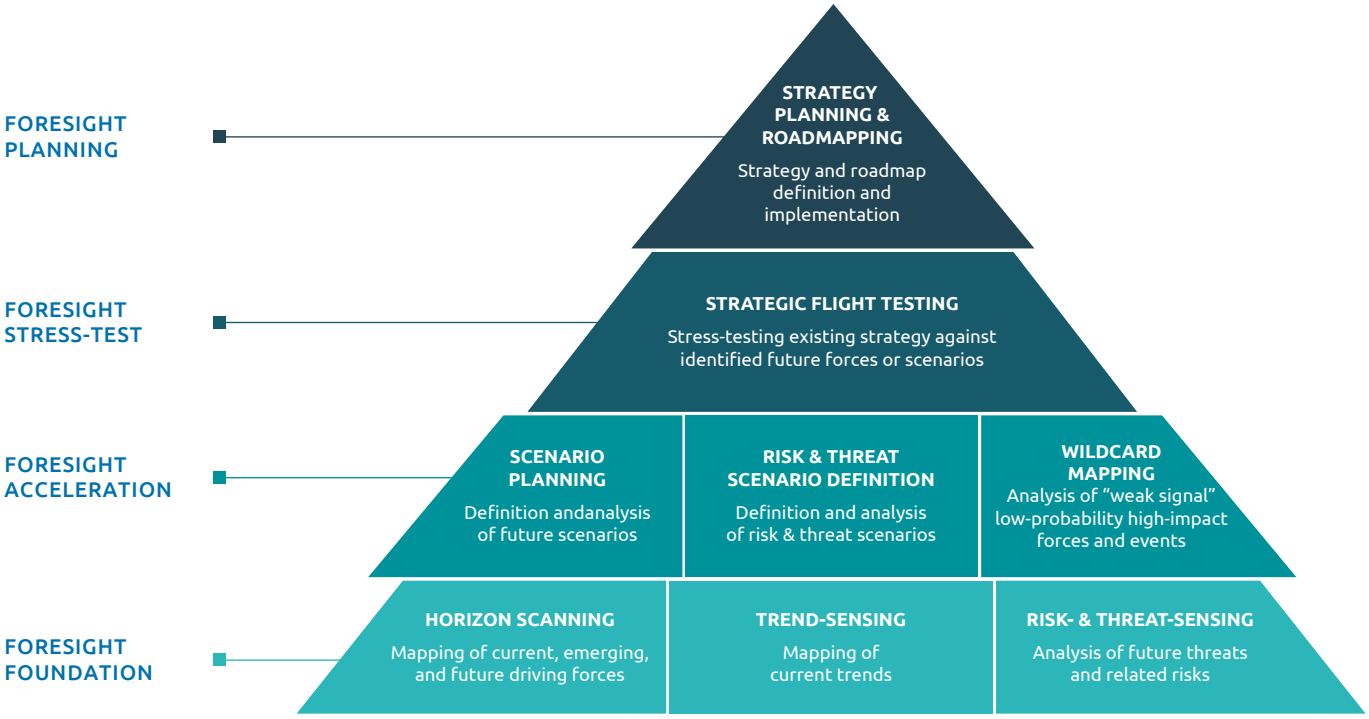

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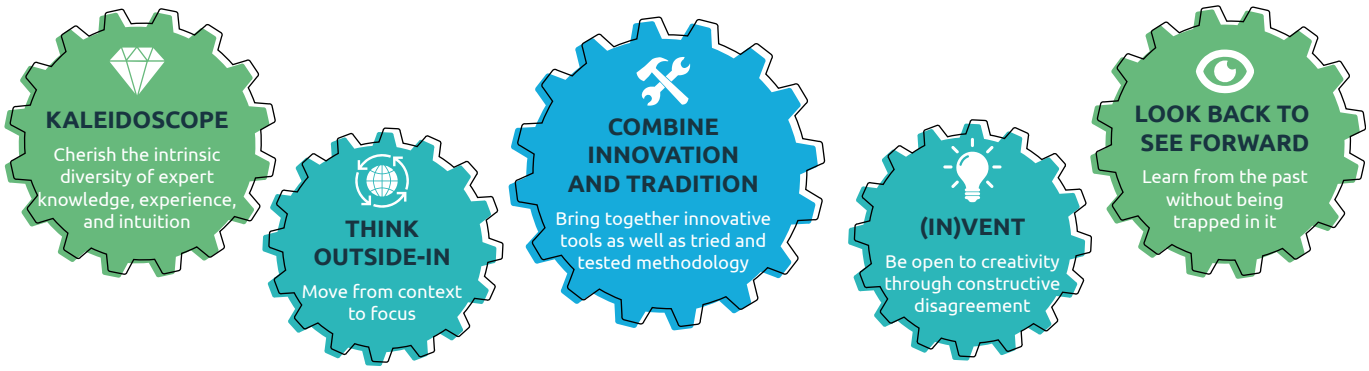
Figure 3 **Five principles that underpin our Strategic Foresight approach**



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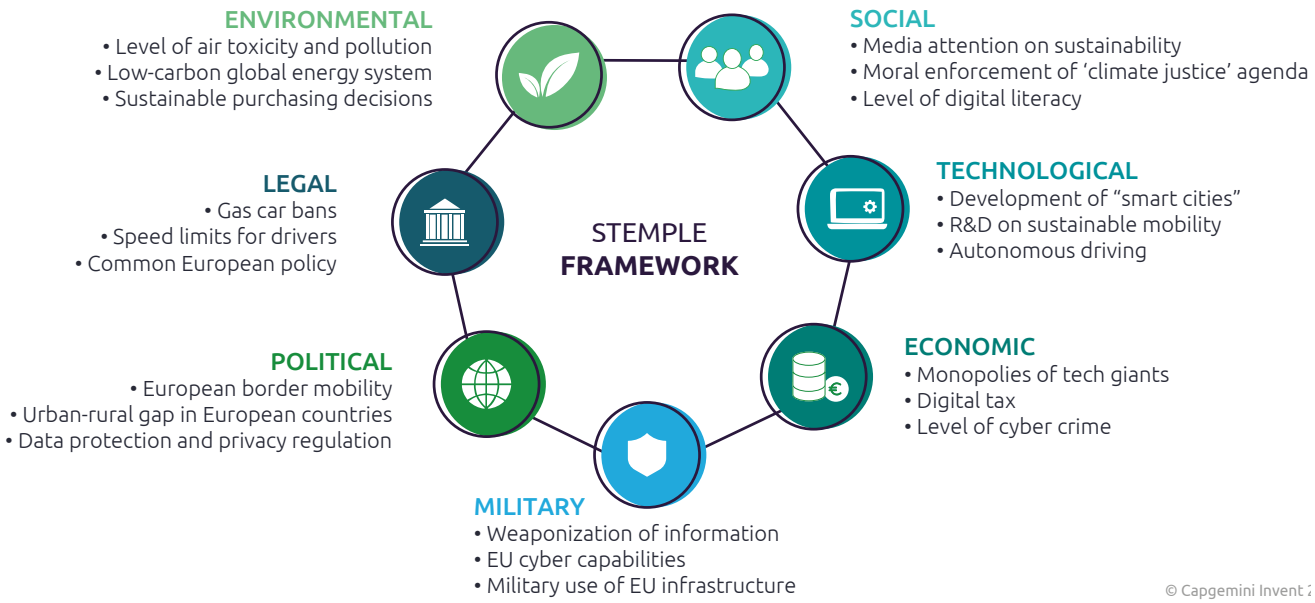
This is precisely what we did in this project. Combining the approaches of horizon scanning, trend-sensing, and scenario analysis, we created a holistic picture of the forces driving sustainable mobility and the trends impacting on sustainable mobility in Europe until 2030. Based on this, we built four alternative future scenarios on what sustainable mobility could look like. These driving forces, trends, and scenarios serve as a foundation for creating future-ready strategy – and ultimately, inventing the future we want.

3 DRIVING SUSTAINABLE MOBILITY: A HORIZON SCAN ON DRIVING FORCES IMPACTING SUSTAINABLE MOBILITY TOWARDS 2030

In order to build a positive future of sustainable mobility, we need an understanding of those forces driving sustainability and mobility in Europe until 2030. Horizon scanning, the analysis of driving forces, ensures holistic 360° vision on current, emerging, and future developments in this field. It enables a cross-industry, interdisciplinary view and reduces blind spots. Driving forces can be social, technological, economic, military, political, legal, or environmental (STEMPLE) variables that hold the potential to impact our future. They form the foundation of Strategic Foresight.

For the future of sustainable mobility, we shortlisted 139 such driving forces across all STEMPLE categories. These drivers emerged in our technology-based research, traditional research, and expert conversations and were vetted and selected by our Foresight Force based on their relevance for the future of sustainable mobility. Of course, there are many more factors impacting this complex field – however, to capture the complexity and ambiguity around sustainable mobility while reducing the noise, a focus on key driving forces is necessary. To refine this focus, we then rated each of these driving forces according to its individual impact on the future of sustainable mobility as we approach 2030, and on the uncertainty attached to its individual development. This resulted in a driver landscape matrix with three zones of drivers: the focus zone (top right), narrative zone (top left), and the accessory zone (bottom).

Figure 4 **The STEMPLE framework in practice – Ensuring a holistic 360° view on the future of sustainable mobility**



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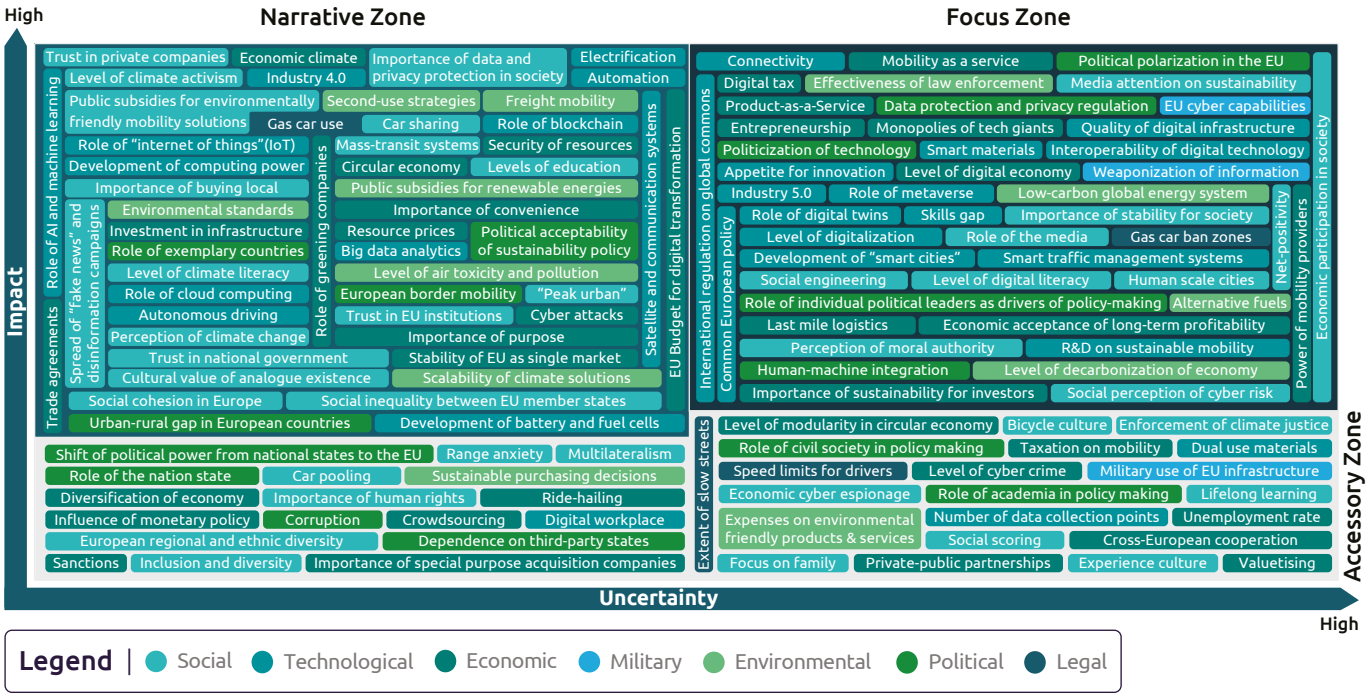
TREND EXPLORER

The VUCA world creates a lot of noise around current, emerging and future topics. When researching topics with traditional search engines, we are overwhelmed by an enormous mass of information. This makes it easy to get lost and miss out on key information. In the field of Strategic Foresight, the problem is aggravated by the enormous amount of factors that need to be pinpointed to generate 360° vision.

Technologized research tools help us reduce the noise and cut to the chase by focusing on key developments and recognizing change at an early stage. We leverage the innovative trendexplorer tool to find, consolidate, and analyze driving forces, trends, threats, and risks. The trendexplorer tool helps our analysts to recognize and process information about the transformation around us.

Figure 5 The focus, narrative, and accessory zones of the future of sustainable mobility driver landscape



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Focus Zone: This group of driving forces includes those drivers with a high impact on sustainable mobility and a high uncertainty in how they could develop in the future. These are the driving forces that are particularly representative of our VUCA world and which we need to capture to proactively shape the future. They form the structure of our future world with their function as a "switch" for their individual possible developments. The focus zone included 47 shortlisted driving forces across all STEMPLE categories. One example of a focus zone driver is "human scale cities".

Narrative Zone: This group of driving forces includes those drivers with a high impact on sustainable mobility 2030 and a low uncertainty in how they will develop in the future. The driving forces of the narrative zone give a common development outline in our foresight work. In our scenario planning, they are used as story blocks for the alternative future narratives. The narrative zone included 52 shortlisted driving forces across all STEMPLE categories. The scalability of climate solutions is an example of a driving force from the narrative zone.

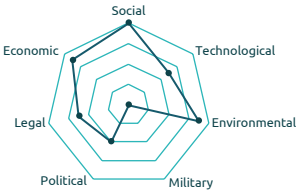
Accessory Zone: This group of driving forces includes those drivers with a lower impact on sustainable mobility. We group these drivers together irrespective of their uncertainty level, as their lower impact rating means they will be slightly deprioritized (but not forgotten!) in the strategy-making to follow. For example, in our scenario planning they will be used as additional input for detailed scenario narratives. The accessory drivers are those that construct the edges of our future world by adding supplementary potential or depth to the narrative and focus drivers. The accessory zone included 40 shortlisted driving forces across all STEMPLE categories. One example for an accessory driver is the number of data collection points.

Figure 6 **Human scale cities - exemplary driver from the focus zone**

Human scale cities

The term "Human scale city" describes a concept of urban planning which focuses on human well-being and aims to improve quality of life. This can apply to any aspect of life, from physical to psychological. A human scale city would enable a livable density and provide social, cultural, economic, and environmental amenities in very close proximity.

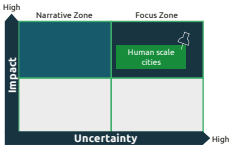
STEMPLE categorization



Human Scale Cities are highly driven by social factors. If the society expresses its needs for a healthy and sustainable environment, it can shape the development. But, the interests of affected businesses and environmental organisations also influence this driver as well as laws around urban development.

Relevance to sustainable mobility

Development towards a human scale city could change urban areas significantly and would have a high impact on what the future of sustainable mobility could look like. It could not only influence the form of mobility, e.g. the usage of autonomous electrical vehicles, but also living areas, e.g. the development of vertical gardens.



Areas sealed off by the construction of motorways could be broken up again in a human scale city. For example, green spaces can return and offer people a place to relax. Motorways, could be deconstructed and used for urban gardens or large bicycle lanes. This could, perhaps, lead to mobility taking place mainly underground in public transport and in the air, e.g. by air taxis.

But, due to the high dependency on developments around urban planning it is very uncertain how this driver will develop in the future.

1800+
European cities are pedestrian-oriented and combine population density with abundant public spaces and nature-rich areas

2021
Reduction of inner-city traffic to be replaced by more public transportation

Illustrative development

1940+
"Architecture of Doom" – Deyan Sudjic Monumental buildings from massive plazas to skyscrapers

2030+
Extensive restructuring measures with a focus on people's well-being to achieve a human scale city

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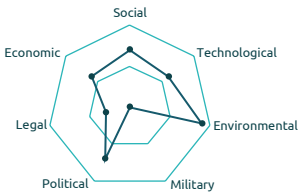
Figure 7 **Scalability of Climate Solutions: Selected driver from the narrative zone**

Scalability of climate solutions - exemplary driver from the accessory zone

A scalable climate solution is anything – a product or service – that helps to solve climate-related problems without requiring continuous investment in production or infrastructure and without increasing fixed costs. The scalability of a climate solution increases the lower the costs become and the higher the acceptance of such solutions is in the market and in society.

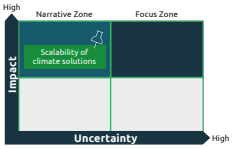
STEMPLE categorization



The scalability of climate solutions is mainly driven by the fact that negative consequences on the environment, for example due to environmental disasters, are increasingly visible. The driver is also dependent on society's demand for more climate-friendly solutions, the subsidization of such solutions, and technological progress.

Relevance to sustainable mobility

The environmental and health impacts of fossil-fuel-based transportation systems are enormous. Nevertheless, fossil fuels remain among the most important energy sources for mobility due to their economic efficiency. Therefore, the increasing scalability of climate-friendly solutions could have a high impact on mobility. This could mean, for example, the conversion of complete mobility solutions, e.g. the switch from combustion engines to electric engines as well as the development of large hydrogen plants and their required infrastructure.



Climate-friendly products already enjoy a high level of acceptance in society and companies use this as a marketing proposition. Additional political support for such solutions reinforces our confidence about the development of this driver.

1988
The Intergovernmental Panel on Climate Change was founded

2017
The Mobility as a Service Alliance was founded

2030+
Widely implemented scalable low carbon climate solutions, e.g. hydrogen as storage medium for electricity

Illustrative development

2015
Paris Agreement: Decision on a 1.5 degrees limit

2020
Introduction of electric buses in Germany

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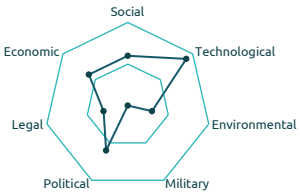
Figure 8 **Number of Data Collection Points: Selected driver from the accessory zone**

Number of data collection points - exemplary driver from the accessory zone

A data collection point is the point where data is being entered – manually or automatically – to a system. It particularly refers to observation and data collecting systems. Technological development in recent years has allowed companies to increase the number of data collection points in their services. A large part of today's "big data" originates from consumer data or data that is constantly connected to a consumer.

STEMPLE categorization

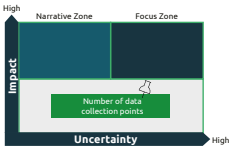


The development of data collection points is mainly dependent on technological factors. The technology defines how many data collection points are possible. Social, political, and economic factors also influence the development of this driver, but the influence is always dependent on technological feasibility.

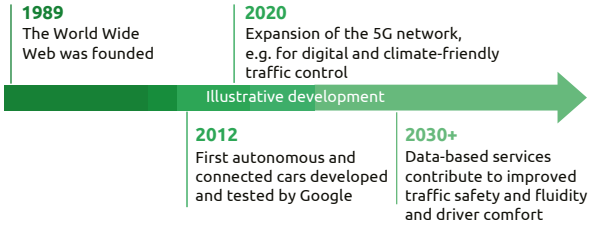
Relevance to sustainable mobility

The amount of data in circulation doubles roughly every 3 years. With technology and data evolving at these speeds, in 6 years a company could have 4 times as much data while being able to make predictions from this information 8 times faster than today.

This driver is not expected to have a high impact on the way the future of sustainable mobility will develop. But this driver offers additional potential for other focus and narrative drivers, e.g. by offering enormous potential to react to customer behavior and thus influence the development of sustainable and innovative, supplementary services.



As examples, traffic routes could be made more efficient if all traffic participants shared their data, or on-demand autonomous services could be suggested to customers when they are looking for a destination for the weekend.



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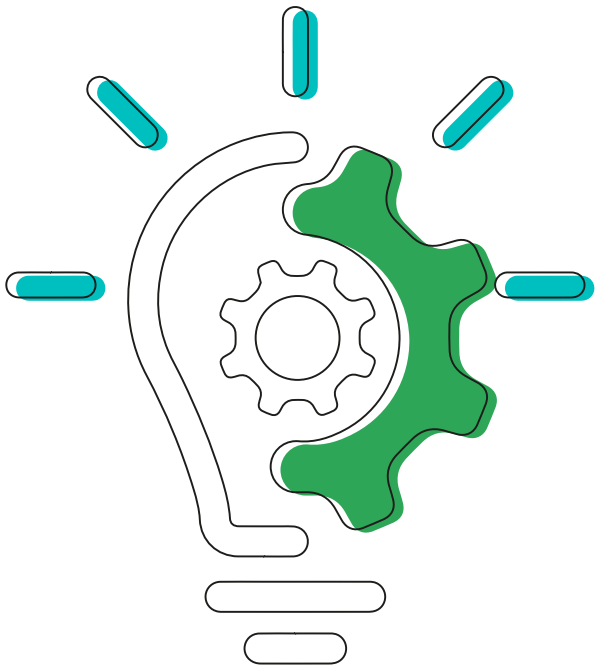
Each of these three zones plays a different role in constructing future-ready strategy. By definition, this horizon scan allows us to capture the uncertainty related to individual factors around sustainable mobility. Understanding these forces at play and their interaction is vital in pinning down the factors contributing the highest volatility, which is essential if we are to create a clear view of what lies ahead for sustainable mobility. This process massively reduces the complexity around the future of sustainable mobility – and how we can impact it. We took this understanding to the next level by supplementing it with trend-sensing and scenario analysis.



4 TRENDING SUSTAINABLE MOBILITY: NINE TRENDS FOR THE FUTURE OF SUSTAINABLE MOBILITY TOWARDS 2030

The future of sustainable mobility will be shaped by a number of key trends. Trends are overarching determinants of the future formed by the interaction of various driving forces. They hold the potential to tip our future in one direction or another. In trend-sensing, we group such interacting driving forces into forward-looking clusters of large-scale developments. A trend combines drivers from various social, technological, economic, military, political, legal, and environmental categories of the STEMPLE framework. Trend-sensing thus helps us to capture complex landscapes of driving forces in a clear and understandable manner as a basis for strategic planning. By definition, we focus particularly on those existing or emerging drivers with a low uncertainty (i.e. from the narrative and parts of the accessory zones of the horizon scan matrix) when clustering trends. Through this clustering methodology, new developments can be pinpointed from their earliest stage. Following the clustering, we verified each trend with our interdisciplinary Foresight Force expert group.

Based on the 139 driving forces shortlisted in our horizon scan, we clustered nine trends on sustainable mobility: Urban reset, Well-being on the move, Mobility reasoning, Neo-politics, Green tech design, Data empowerment, Repurposed business models, Trust in mobility, Ethical mobility.

Figure 9 **Clustering interacting drivers into overarching trends**

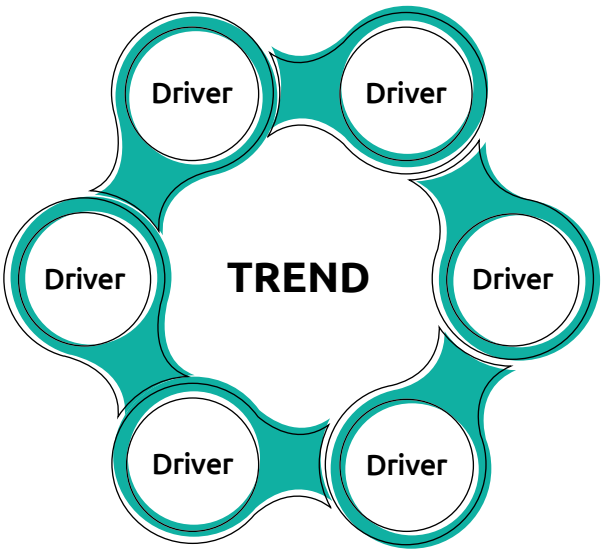


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Figure 10 **Overview of the nine sustainable mobility trends**

ETHICAL MOBILITY
This describes a value-based attitude, encompassing ethical correctness and societal values that influences future mobility, as it shapes the ethical standards of society, e.g. changing mobility expectations among different generations.

URBAN RESET
This describes a paradigm shift in urbanization towards more sustainable urban areas. This impacts not only the nature of mobility but also the way of living, building, and shaping of spaces.

TRUST IN MOBILITY
This is a redefinition of expectations and beliefs regarding the cybersphere, institutions, and multinational corporations that drives the perception of mobility in society.

WELL-BEING ON THE MOVE
This describes an individual's lifestyle decisions relating to mobility and the personal health factors that influence these.It includes both technological and other factors and contributes to the political climate around sustainable mobility.

REPURPOSED BUSINESS MODELS
This describes the economic shift towards purpose-driven and value-focused business models in the mobility area. It drives a sustainable economic approach to how mobility is sold to customers.

MOBILITY REASONING
This describes the questioning of how and why we use specific mobility solutions. A growing awareness of the impact of mobility is influencing decisions by individuals, institutions, and private companies.

DATA EMPOWERMENT
This refers to data-based and technological solutions for mobility as well as the connection of the digital and analogue world and is driven by data leveraging by public and private sector organizations.

NEO-POLITICS
The emergence of new social and political movements outside the traditional systems has been facilitated by social media technology. For policy makers, this increasingly legitimizes climate-friendly decisions and the disincentivizing of climate-damaging mobility solutions.

GREEN TECHDESIGN
This refers to a technological race between companies to achieve the most energy efficient and emission-free solutions for mobility. Solutions will now have to be measured by their energy balance, throughout their entire life cycle.

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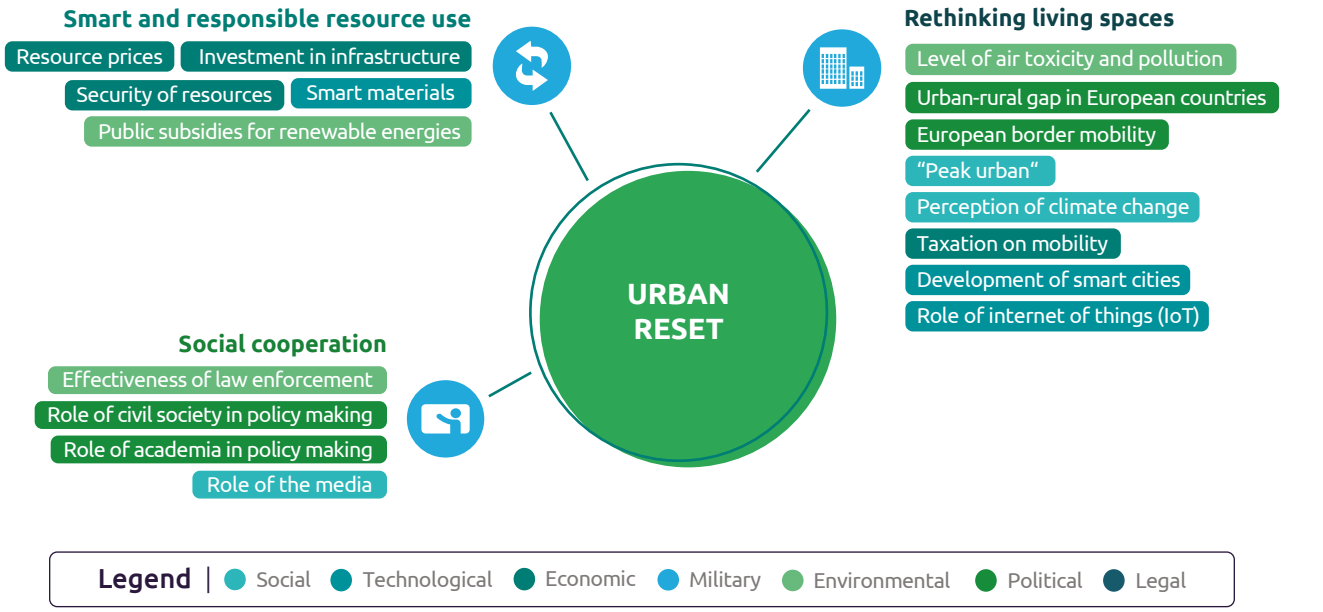
As the process of clustering is key to understanding each individual trend, we have mapped this for the the trend "Urban reset", as an example. Urban reset describes a paradigm shift in urbanization towards more sustainable movement, impacting living, building, and shaping of spaces. The urban reset of existing cities leads to new concepts of mobility: what medium of mobility will be relevant in the future and how does the medium of mobility respond to the living spaces and infrastructures surrounding us? We can already observe the beginning of this urban reset in cities today. However, this transformation will pick up with exponential speed in the future. Living spaces are changing, and with them the demands for mobility environments. But what does this mean for the future of mobility? For the trend Urban reset, we have identified three key clusters of shortlisted interacting driving forces: Smart and responsible resource use, Co-determination, and Rethinking living spaces.

Figure 11 **Driver clustering for the trend "Urban reset"**



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The first key driving force cluster of the Urban reset trend is the smart and responsible use of resources. This cluster includes a variety of driving forces: smart materials, resource prices, the investment in infrastructure, public subsidies for renewable energies, and the security of resources. These driving forces interact with each other closely and hold the potential to premanently impact sustainable mobility. They could determine not only the technologies we use in mobility but – through their impact on shaping living and working spaces – also how far and why we move around where we live.

A second key cluster within Urban reset is the increasing co-determination of sustainable mobility by various stakeholders. The interaction between the various actors – such as the state, the private sector, the media, academia, and civil society – plays a crucial role in defining future (mobility in) urban areas. The interaction of driving forces, like the role of civil society or academia in policy making or the role of the media, lead to a new dynamic of stakeholder engagement regarding sustainable mobility, especially in urbanized settings.

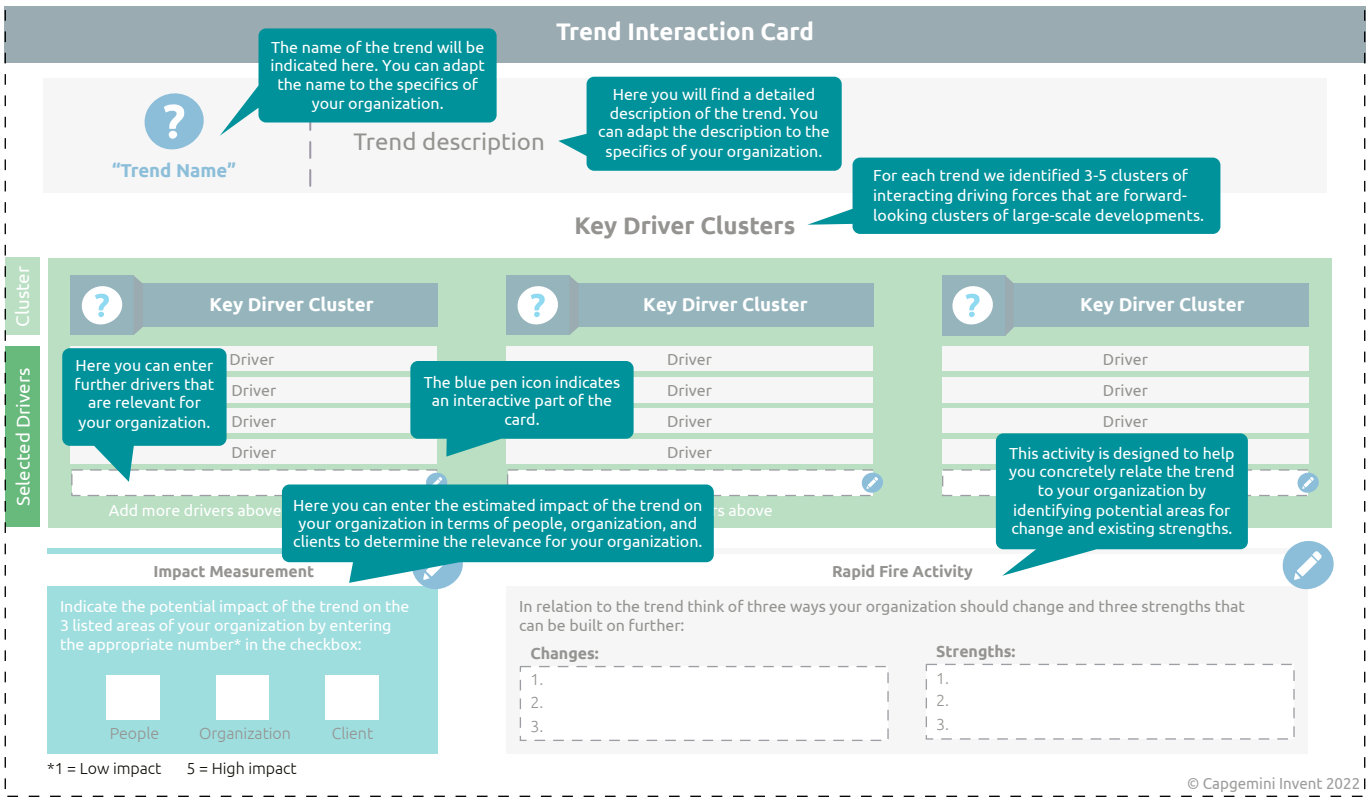
A third cluster of driving forces emerges around the rethinking of living spaces. The rethinking of living spaces influences the way we live and move. Cities are confronted with new demands, and these are met in ever more innovative ways. Driving forces such as "smart city" development, digital twins, "peak urban", and the perception of climate change in society, create a drive to redevelop living spaces in a sustainable way – including transport infrastructure and motivation for movement.

Through the interaction of these three key clusters, Urban reset appears as a strong trend for the future of sustainable mobility. It sets the frame and direction of the way we can, will, and want to move in and across urban spaces in the future.

To build a positive future, it is not enough to simply understand the sustainable mobility trends. Instead, these trends and their underlying driving forces must be addressed head-on and integrated into strategy making and implementation. There are a variety of ways to do this. As a starting point for action, we have designed trend interaction cards for each of the above nine trends. The goal of these trend interaction cards is to spark dialogue and invite further thinking and application to your individual context. The trend interaction card provides an overview of the definition and selected key drivers of the trend, as well as some key questions an organisation can answer for themselves to consider the impact of this trend on their journey to a positive future. The cards may be used as food for thought or the basis of brainstorming or workshop sessions. Let´s build a positive future of sustainable mobility!

These nine trends indicate the direction in which sustainable mobility is moving as we approach 2030. While trends are developments that we are already seeing around us, they are in no way set in stone and can change direction or nature either in their long-term evolution or in a sudden reactive change. It is key to not just respond to these trends, but to proactively steer existing and emerging developments to build a positive future. Trend-sensing is thus extremely useful in understanding what lies ahead, but needs to be bolstered by further foresight activities to produce impactful action. Scenario planning is one of the foresight methodologies that helps us to become architects of a positive future by building on the drivers identified in the horizon scan and the trends pinpointed in trend-sensing. Scenario planning makes drivers and trends more tangible by telling stories of the future that allow reflection on existing strategies and facilitate future-ready strategic planning.

Figure 12 **A starting point for action: Trend Interaction Cards**



Trend Interaction Card

Urban Reset

Urban reset describes a paradigm shift in urbanization towards more sustainable urban areas, impacting not only the form of mobility but also the way of living, building, and shaping of spaces.

Key Driver Clusters

Cluster	Smart and responsible resource use	Social Cooperation	Rethinking living spaces
Selected Drivers	Smart materials	Effectiveness of law enforcement	Level of air toxicity and pollution
	Investment in infrastructure	Role of civil society in policy making	Development of smart cities
	Security of resources	Role of academia in policy making	European border mobility
	Public subsidies for renewable energies	Role of the media	Taxation on mobility
	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Urban Reset" think of three ways your organization should change and three strengths that can be built on further:

Changes:
1.
2.
3.

Strengths:
1.
2.
3.

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Trend Interaction Card

Well-being on the move

Well-being on the move describes an individual's value-based life-style decision driving the way and intention of mobility to establish personal health. Well-Being on the move includes digital and analogue enablers and the political landscape for a more sustainable mobility.

Key Driver Clusters

Cluster	Values	Political background	Digital/ analogue enabler	Individual freedom
Selected Drivers	Net-positivity	Importance of stability for society	Digital workplace	Focus on family
	Inclusion and diversity	Role civil society in policy making	Skills gap	Lifelong learning
	Importance of purpose	Political polarization in the EU	Level of education	Unemplyment rate
	Sustainabile purchasing decisions		Human-machine integration	
	Add more drivers above	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Well-being on the move" think of three ways your organization should change and three strengths that can be built on further:

Changes:
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Strengths:
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Trend Interaction Card

Consciousness of mobility

Consciousness of mobility describes the questioning of how and why we use specific mobility solutions. A growing awareness of the impact of mobility is influencing decisions by individuals, institutions, and private companies.

Key Driver Clusters

Cluster	Attitude towards technological awareness	The way of mobility	Enablers to consciousness
Selected Drivers	Appetite for innovation	EU cyber capabilities	Social cohesion in Europe
	Quality of digital infrastructure	Private-public partnerships	Environmental standards
	Dual use materials	R&D on sustainable mobility	International regulation on global commons
	Role of AI and machine learning	Product-as-a-service	Level of air toxicity and pollution
	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People | Organization | Client

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Consciousness of mobility" think of three ways your organization should change and three strengths that can be built on further:

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Trend Interaction Card

Neo-politics

Neo-politics refers to how the emergence of new social and political movements outside the traditional systems has been facilitated by social media technology. For policy makers, this increasingly legitimizes climate-friendly decisions and the disincentivizing of climate-damaging mobility solutions.

Key Driver Clusters

Cluster	Climate change	Society and political background	Activism
Selected Drivers	Environmental standards	EU regulation regarding imports of non-green products	Perception of climate change
	Level of sustainability	Role of individual political leaders as drivers of policy-making	Influence of social media
	Number of environmental disasters in Europe		Influence of climate activists
	Level of air toxicity		Perception of moral authority
	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People | Organization | Client

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Neo-politics" think of three ways your organization should change and three strengths that can be built on further:

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Trend Interaction Card

Green tech design

Green tech design refers to a technological race between companies to achieve the most energy efficient and emission-free solutions for mobility. Solutions will now have to be measured by their energy balance, throughout their entire life cycle.

Key Driver Clusters

Cluster	Green mindset	Role of private – public partnership	Environmental regulations	Innovation standards
Selected Drivers	Level of climate activism	Role of greening companies	Environmental standards	Security of resources
	Level of climate literacy	Private–public partnerships	Common European policy	Smart materials
	Media attention on sustainability	Political acceptability of sustainability policy	Enforcement of climate justice	Scalability of climate solutions
	Second-use strategies		Sanctions	Level of air toxicity and pollution
	Add more drivers above	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Green tech design" think of three ways your organization should change and three strengths that can be built on further:

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Trend Interaction Card

Data empowerment

Data empowerment refers to data-based and technological solutions for mobility as well as the connection of the digital and analogue world and is driven by data leveraging by public and private sector organizations.

Key Driver Clusters

Cluster	Security	Data network	Data ecosystem	Data leveraging in politics
Selected Drivers	Economic cyber espionage	Role of blockchain	Industry 4.0	Social scoring
	Cyber attacks	Role of digital twins	Industry 5.0	Politicization of technology
	Data protection and privacy regulation	Big data analytics	EU cyber capabilities	Satellite and communication systems
		Development of computing power	Role of metaverse	
	Add more drivers above	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Data empowerment" think of three ways your organization should change and three strengths that can be built on further:

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Trend Interaction Card

Repurposed business models

Repurposed business models describes the economic shift towards purpose-driven and value-focused business models in the mobility area. It drives a sustainable economic approach to how mobility is sold to customers.

Key Driver Clusters

Cluster	Purpose-driven industry	Why to do business	Nature of mobility industry
Selected Drivers	Economic Participation in Society	Influence of monetary policy	Circular economy
	Economic climate	Trade agreements	Entrepreneurship
	Importance of purpose	Diversification of economy	Multilateralism
	Economic acceptability of long-term profitability	Level of decarbonization of economy	Role of AI and machine learning
	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Repurposed business models" think of three ways your organization should change and three strengths that can be built on further:

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Strengths:
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Trend Interaction Card

Trust in mobility

Trust in mobility is a redefinition of expectations and beliefs regarding the cybersphere, institutions, and multinational organizations that drives the perception of mobility in society.

Key Driver Clusters

Cluster	Institutional involvement	Dependencies	Cyber	Perception of mobility
Selected Drivers	Trust in national government	Private-public partnerships	Effectiveness of law enforcement	R&D on sustainable mobility
	Trust in private companies	Stability of EU as single market	Data protection and privacy regulation	Role of academia in policy making
	Trust in EU institutions	International regulation on global commons	Interoperability of digital technology	
	Role of the media			
	Add more drivers above	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Trust in mobility" think of three ways your organization should change and three strengths that can be built on further:

Changes:
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Strengths:
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Trend Interaction Card

Ethical Mobility

Ethical Mobility describes a value-based attitude of mind, encompassing ethical correctness and societal values driving future mobility, that influences the ethical standards of society, e.g. changing of mobility expectations among different generations.

Key Driver Clusters

Cluster	Ethical correctness	Reliability	Tech power	Societal values	Generational innovation focus
Selected Drivers	Spread of "fake news" and disinformation campaigns	Role of civil society in policy making	Monopolies of tech giants	Perception of moral authority	R&D on sustainable mobility
	Data protection and privacy regulation	Dependence on third-party states	Digital tax	Importance of stability for society	Entrepreneurship
			Role of AI and machine learning		Level of digital literacy
	Add more drivers above	Add more drivers above	Add more drivers above	Add more drivers above	Add more drivers above

Impact Measurement

Indicate the potential impact of the trend on the 3 listed areas of your organization by entering the appropriate number* in the checkbox:

People ☐ Organization ☐ Client ☐

*1 = Low impact 5 = High impact

Rapid Fire Activity

In relation to the trend "Ethical mobility" think of three ways your organization should change and three strengths that can be built on further:

Changes:
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Strengths:
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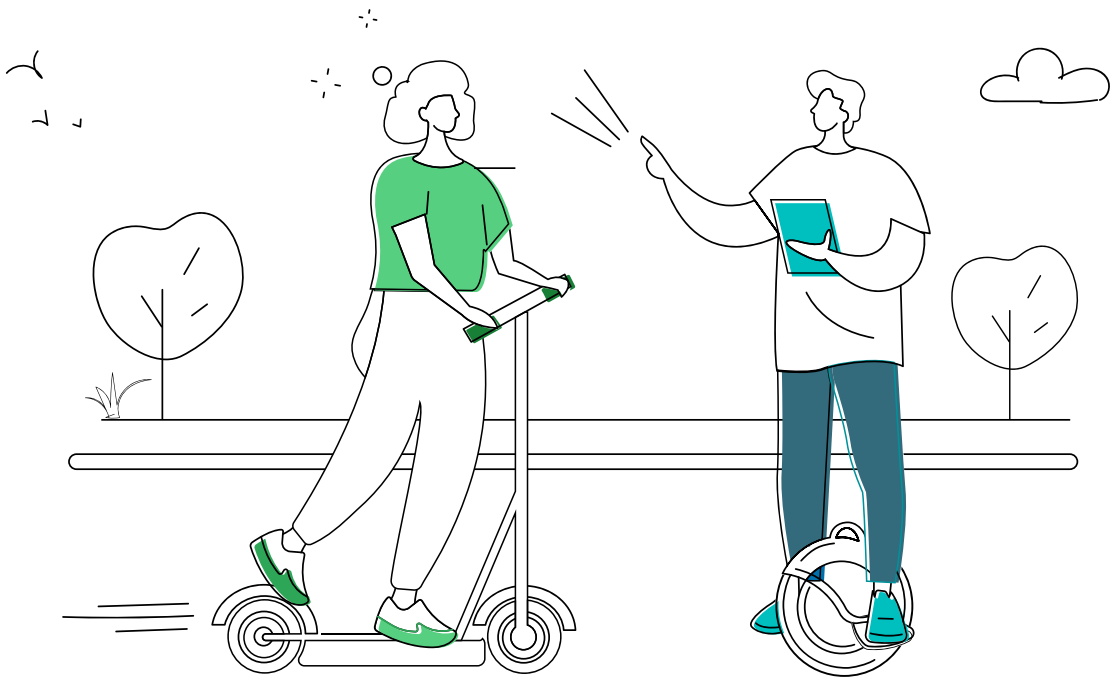
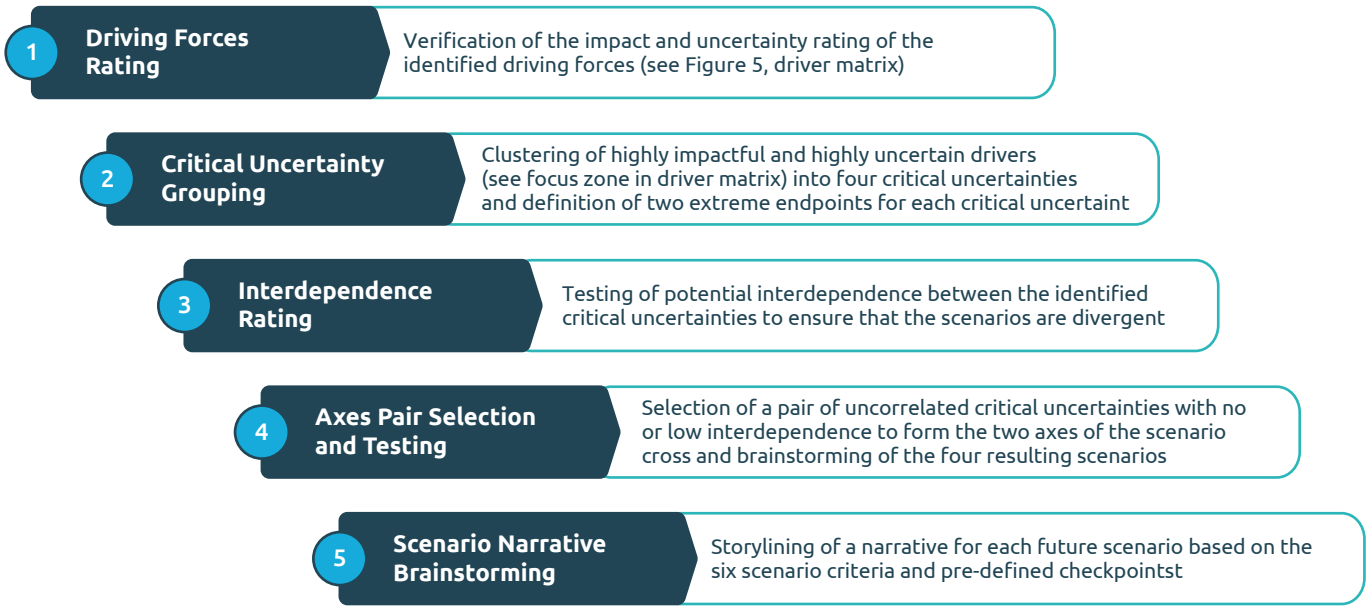


5 INVENTING THE FUTURE: FOUR SCENARIOS FOR SUSTAINABLE MOBILITY IN EUROPE TOWARDS 2030

Scenario planning is a Strategic Foresight methodology aimed at translating the forces forming our future into alternative future worlds. Through scenario planning we capture critical uncertainties that are usually excluded but are crucial to effective strategy. The basis of this process is the holistic driving forces and trends that have been identified. The process brings together a diverse range of stakeholders and constructs a joint basis for strategic action. It is a unique forward-focused methodology that anticipates uncertain change and prepares strategic responses. It combines an academically rigorous methodology with innovative interaction formats and tools. As Peter Schwartz, one of the pioneers of Scenario Planning, put it, scenarios are "a tool for ordering one's perception about alternative future environments in which one's decisions might be played out".[3] As such, scenarios help us in our endeavor to build a positive future by allowing us to "re-perceive" and "reframe" the way we look at the future.[4]

In our scenario analysis of the future of sustainable mobility, we therefore developed four alternative future scenarios to serve as a basis for strategic conversation and, ultimately, strategic action. To do so, we applied our five-step scenario process across four workshops with our interdisciplinary Foresight Force – which includes experts in sustainability, mobility, and foresight – and discussed and validated our results with Citizen Lab participants at IAA Mobility 2021.

Figure 13 **Our five-step scenario workshop process**



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[3] *Schwartz, The Art of the Long View, p.4.*
[4] *Rafael Ramirez and Angela Wilkinson, Strategic Reframing: The Oxford Scenario Planning Approach (Oxford, 2016), pp.3-4.*

As a result, four scenarios emerged:

1 SUSTAINLAWBILITY

2 ISLANDS OF MOBILITY

3 REMOVE

4 HYPERSCALED MOBILITY

These four scenarios emerge by combining two independent critical uncertainties about the future of sustainable mobility that emerged in our scenario workshops. Critical uncertainties are clusters of highly uncertain and highly impactful driving forces from our focus zone that hold the potential to determine our future and steer our tomorrow in one direction or another.

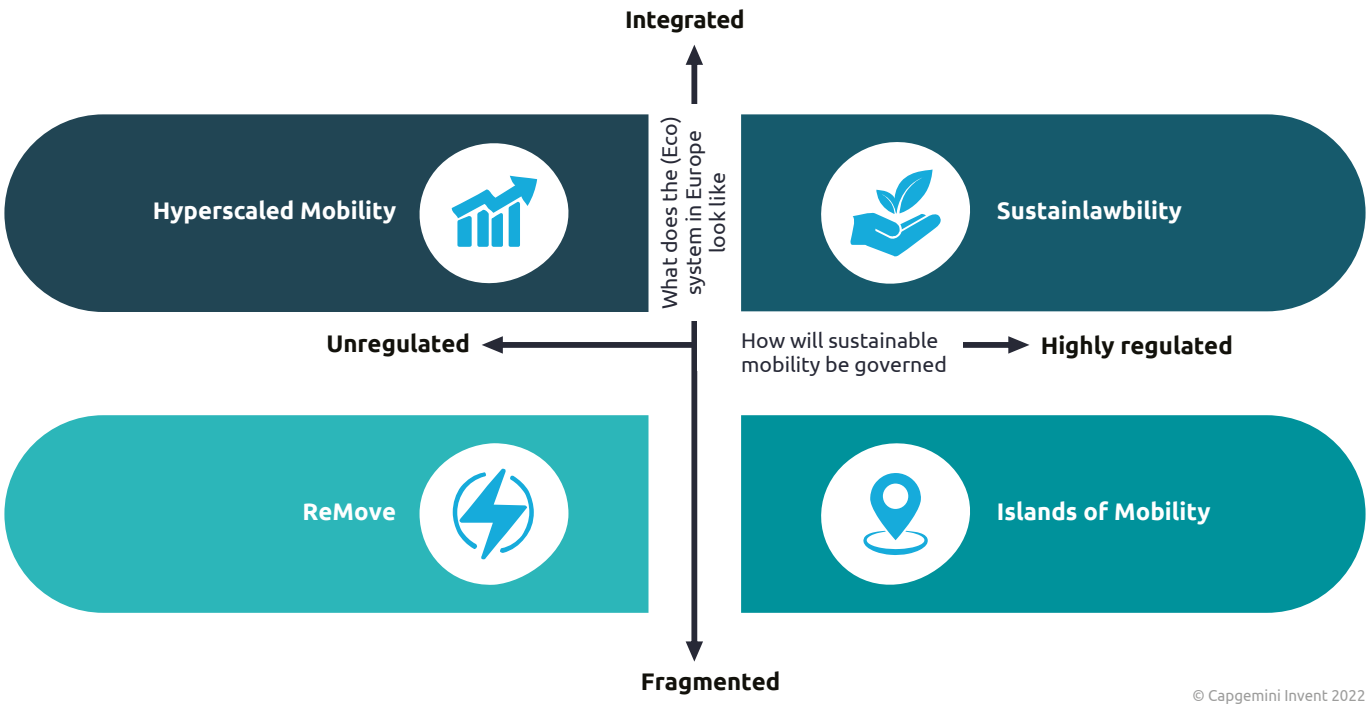
The two selected critical uncertainties for the future of sustainable mobility towards 2030 were the questions of:

- whether the (eco)system in Europe will be integrated or fragmented
- whether sustainable mobility will be regulated or unregulated

The combination of these two questions and their four endpoints in a 2 x 2 framework results in a frame for our four scenarios. Each of these scenarios fulfils six criteria: they are all plausible, relevant, challenge our perceptions, contain an inherent logic, balance negative and positive aspects of their story while being divergent from the remaining scenarios, and engage stakeholders.

These four scenarios are set in 2030 and map vastly different stories of what sustainable mobility could look like by this point.

Figure 14 **Four scenarios on the future of sustainable mobility 2030**



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SCENARIO 1:
SUSTAINLAWBILITY

This scenario is characterized by an integrated (eco)system and regulated governance of sustainable mobility.

We are writing in the year 2030. A lot has changed since the early 2020s. In 2030, sustainability is the key priority in Europe for governments, the economy, and society. The EU has stepped up and pushed member states to clearly regulate mobility for sustainability. Strong cooperation between the private and public sector has resulted in an integrated, smart ecosystem focused on cutting the need for long-range mobility and making necessary movement fully sustainable. Sustainable mobility has become an integral part of the EU's DNA and its importance is socially, economically, and politically well accepted. Sustainability and mobility have become one.

Public Sector

In the face of loud demands for action from society in response to a series of significant natural disasters in the early 2020s, the EU has defined sustainability – and with it sustainable mobility – as an intrinsic European value. In the 2025 Sustainable Mobility Summit, national governments came together to define and implement a series of sustainable mobility laws that ensured 100 percent sustainable mobility by 2030. In the mid 2020s, while regional and national organizations provided this framework, local governments – in close cooperation with private sector innovators – pioneered smart, human scale cities with sustainable mobility solutions. Over time, these have expanded across the entirety of Europe, putting the EU at the forefront of sustainable mobility. Connected autonomous and all-electric vehicles can be seen across the EU, usable by every citizen with their digital identity card. However, this has also made Europe a target for massive cyber attacks, spreading fear and apprehension. The EU is also facing a number of court cases in which liberty-minded citizens are claiming their right to free choice of transport.

Private Sector

The private sector has pushed this mobility transformation from the start. Climate consortiums consisting of organizations of all shapes and sizes across industries, including greening companies, have come together to build a mobility ecosystem centered on environmental needs and focused on human convenience. A single mobility platform across the EU provides seamless ad-hoc mobility through public transport, sharing models, and mobility reduction incentives. With the early recognition that the nature of mobility is being redefined, in how, when, and why customers travel, European mobility providers have become global leaders of technology innovation, pioneering in areas such as electrification, second use of materials, and mobility infrastructure. This redefinition of mobility has largely happened in tune with social developments across Europe. However, the previously deprioritized problem that resources needed for the production of sustainable mobility solutions are becoming scarce is now coming to the fore. This leads not only to increasing prices and less supply, but also has disastrous consequences for the inhabitants of the supplying countries. With the earlier focus on sourcing within Europe, companies from other countries, such as China and the USA, have been excluded from the European mobility market. This is now causing a backlash and closing off their markets to European mobility providers.

Society

Following the impact of severe natural disasters, the COVID-19 pandemic, and the re-examination of personal values, sustainable "glocality" has become a new guiding principle of movement in Europe. In human scale cities, mobility is primarily local and for leisure, and almost entirely focused on the excellent public or shared transport options. Former city loop highways have been converted into parks and community spaces. Remote areas have been linked to cities and regional hubs through the one-stop digital mobility platform. Work travel has been reduced to a bare minimum through use of digital workplaces. Running errands such as shopping has become redundant with the seamless sustainable delivery and logistics system and local neighborhood offers. The young generation has grown up with sustainable mobility as a given. However, this new reality brings with it a number of societal challenges – concerns for privacy and data protection have led to communities of social dropouts. With more focus on locality and global connections happening increasingly digitally, the easy cosmopolitanism of previous generations has given way to cautious curiosity of what is called the "digital distance".

SCENARIO 2:
ISLANDS OF MOBILITY

This scenario is characterized by a fragmented (eco)system and regulated governance of sustainable mobility.

The year 2030 has had a tumultuous start. Since various European governments have enacted strict mobility regulation without providing real solutions for how to achieve these, protests by the private sector and mobility users have been rampant. The trust in governments has been lost. The mobility ecosystem is severely divided and offers unequal access to European citizens. The necessity for sustainability has become blatantly clear to citizens, and the necessary buy-in to adapt to this necessity, including in mobility choices, has been accepted by most parts of society, especially the younger generations. However, society is massively split about the limitation on mobility that governmental sustainability policies entail. Islands of mobility innovation have emerged, but overall Europe has fallen behind globally. With mobility and sustainability perceived as opposites, the private sector has been using its energy to find loopholes in the differing regulations globally.

Public Sector

Following the increasing pressure to act for sustainability in the early 2020s, various governments have clamped down on mobility and heavily regulated the use of unsustainable mobility. This has resulted in a tension-packed patchwork of mobility policies across Europe, with some countries, like Germany, being more lenient than others, like the Nordics. The inclusion of sustainability monitoring in social scoring systems in China has given rise to discussions about even stricter enforcement of sustainable mobility. The massive rural-urban infrastructure gap has made this change particularly contested in rural areas, where sustainable mobility options have remained limited since the early 2020s. While there is large agreement in society that sustainable mobility is needed, citizens, civil society, and private sector organizations largely agree that the governmental clamp down is lacking stakeholder consultation and real solutions. This leads to widespread protests and a widening polarization of society, including a generational break. The gap between rich and poor is widening on a national but also on a European level, as not every country has the same financial capacity to build up their infrastructure towards a sustainable goal. Nevertheless, some goals have been achieved: for example, air pollution has been reduced and biodiversity has profited from the new politics.

Private Sector

The European mobility sector and especially the automotive industry have done too little too late. Because of the political unacceptability of cars, the support for the automotive industry in Europe has decreased significantly. Although countries like Germany scrambled to save the industry, global players with more sustainable mobility technology have taken over the market. This has resulted in a crisis of the European mobility industry, including a large loss of jobs. But, as a consequence, creative start-up founders have introduced new apps and alternative transportation ideas, such as the new generation hyperloop, a high-speed air-cushioned capsule transport system. This constitutes a small but growing market.

Society

With most people unable to afford a car – deemed as a less sustainable mobility choice and hence highly taxed – mobility largely happens via public transport. The fragmentation between mobility service providers has made moving around more sustainable, but also much more complex and inconvenient. The lack of mobility links between rural and urban areas has resulted in a geographic disconnect that has led some to form rural islands and forced others to move to cities. Overseas travel has become a luxury; local destinations and virtual tourism are the only options for many. While society supports sustainability, they do not support the mobility policies enforced in Europe. Due to the increased costs of mobility, there is a high awareness of sharing in society. All mobility options can be shared with almost anyone, which makes people look out for each other again. Digital literacy has also increased massively with these changes – people are technology-savvy, more cybersecurity-aware, and less likely to reject unknown innovative technologies.

SCENARIO 3: REMOVE

This scenario is characterized by a fragmented (eco)system and unregulated governance of sustainable mobility.

The inability of governments to cope with climate change, including sustainable mobility, has led to a patchwork system of sustainable mobility across Europe in 2030. Progress resulted from bottom-up pressure of the young generation, in combination with specific private sector innovation where sustainable mobility was profitably scalable.

Social movements such as flight shaming have expanded to all forms of unsustainable mobility. The necessity of mobility being sustainable has been accepted by European society, but the lack of regulation in combination with the fragmented (eco)system makes consistent implementation across Europe difficult.

Public Sector

Unable to find solutions for climate change, governments have been practically removed from the field of sustainable mobility. Vague commitments to climate goals have not resulted in any concrete action by European states to make mobility sustainable. Governments are increasingly focused on coping with the negative impact of the climate crisis, such as climate refugees. Sustainable mobility is thus not a priority. With the role of sustainability being a question of economy and society and not of politics, many costly subsidies are no longer necessary and the savings have been invested in other areas, such as the digitalization of public authorities and education.

Private Sector

The vacuum left by governments in developing sustainable mobility solutions has been filled by the private sector. Triggered by the demand from society, innovative transport options have been developed. Entrepreneurs and start-ups have pushed for a new convenient and integrated mobility in big cities. Large automotive manufacturers and suppliers had to pick up speed based on this pressure. However, while certain cities like Munich or Talinn have become globally leading regional sustainable mobility hubs, others have fallen behind. Rural mobility suffers from the same divide, with certain regions pioneering sustainable mobility across the board and others remaining disconnected. With a new focus on digital workplaces, private sector organizations have fully digitalized the workspace for all European employees. Small, representative meeting and teambuilding spaces for special meetings have become the norm; many firms no longer provide desks for daily work.

Society

The value reorientation triggered by the “Fridays for future” generation led to massive pressure on governments and the private sector to make mobility sustainable. When governments were unable to follow this call, civil society actors took matters in their own hands with the Europe-wide “ReMove” campaign to redefine mobility sustainably and remove unnecessary mobility. This has led to a new impact on mobility, with a focus on local sustainable mobility and the need to socially justify unsustainable travel options, such as long-haul flights or owning a private electric car. However, in the patchy mobility ecosystem, citizens are highly unequal. This leads to increasing protests by those outside rural or urban mobility hubs, giving rise to a new wave of nationalism and isolationism. Generational conflict is also looming large, with older generations refusing to subscribe to what they perceive as youthful idealism and naivety.

SCENARIO 4: HYPERSCALED MOBILITY

This scenario is characterized by a fragmented (eco)system and unregulated governance of sustainable mobility.

In 2030, the entirety of Europe is getting connected in an integrated sustainable mobility ecosystem. The long-planned cross-European sustainable mobility programs have borne fruit. Mobility has been taken over by large international transportation enterprises. Society is enjoying the convenience of this expanding sustainable mobility ecosystem. However, foreign and private sector control of European mobility is steadily leading to skepticism and criticism within society.

Public Sector

In the early 2020s, the public sector opted for the carrot instead of the stick and focused its role on incentivizing the private sector to make mobility sustainable. Massive government investments in sustainable mobility technology in the early 2020s have kickstarted the private sector to build a solid network of railroads and environmentally neutral transport options. However, governments have lost all regulatory control of mobility and are merely puppets of private sector players. When foreign investors, particularly from China, started bolstering the local private sectors from the mid-2020s, fear of a loss of political control started looming large. There is particular concern that the infrastructure necessary for this highly connected world is controlled by private corporations. After the governments could not guarantee the quality of digital infrastructure, private corporations took over and created long-awaited necessary solutions.

Private Sector

Fueled by the large investments, mobility "hyperscalers" have developed monopolies for transportation across Europe. They control sustainable mobility fully, and leverage the data produced by daily movement locally, regionally, and globally to perfect the smart mobility ecosystem further. While there is still a way to go, the connected sustainable mobility system is expanding exponentially through the use of AI-based data analytics, reaching more and more people. Through foreign investment, mobility providers have been able to connect globally, for example through China's "Belt and Road Initiative". However, with the power of hyperscalers, innovation comes only from large international players, severely limiting SMEs and start-ups.

Society

Society is enjoying the perks of the convenient sustainable mobility ecosystem and the ability to connect without having to worry about making sustainable choices. Mobility has continued to increase consistently throughout the 2020s, and physical presence has taken precedence over the digital existence, both for work and private life. By 2025, the value of face-to-face interaction has been recognized based on the COVID-19 experience and the following digital drive. The mobility system caters for this. However, calls for the protection of mobility data have been getting louder and louder. Equally, protests against the power of mobility hyperscalers to restrict personal movement have increased massively with a number of cases of restricted mobility accounts getting prominent coverage in the media.

These four scenarios are neither predictions nor forecasts of the future. They are alternative futures that map how developments of the future could play out around key critical uncertainties that are likely to determine our future. As such, they highlight four extreme corner points around a myriad of possible developments between these four corners. Thinking about these extreme corner points allows us to capture the various scales of change in between these corners. This serves as an excellent foundation for building future-ready strategy and inventing our future.

6 GETTING THERE: STRATEGIC FORESIGHT IMPLICATIONS FOR THE FUTURE OF SUSTAINABLE MOBILITY

The drivers, trends, and scenarios outlined in this study constitute just the beginning. They serve as a basis for discussion and, more importantly, action. To build the future of sustainable mobility that we want to see, stakeholders must develop and implement strategies and policies. This horizon scan, trend-sensing, and scenario analysis can form the foundation of such strategies and policies. There is still a long way to go. To kick-start the journey of inventing our future, we have asked some of our Capgemini mobility and industry experts two of the most pressing key questions resulting from this study:

- What key implications result from these sustainable mobility drivers, trends and or scenarios for your area of expertise or industry field?
- What is one key priority action that must be taken now to build a positive future of sustainable mobility?

"In my opinion sustainability with respect Automotive is not just less mobility through less cars. It's rather the intelligent usage of existing mobility concepts and assets, a change by usage of technical capabilities, and the development of new approaches. IT plays a major role in this transformation.

The coordination of mobility solutions to meet customer demand needs self-learning systems to predict the right capacity for the means of transportation. The vulnerability of IT systems especially when it comes to autonomous drive needs to be addressed to prevent lack of trust in the mobility solutions. And all the technology needed for this may not produce a higher carbon footprint then before, which leads to a green tech design by default.

Hence key priority of IT Senior Leadership will be to supply innovative, scalable, but also trusted and sustainable IT Infrastructure and IT services in shorter cycles."

Sebastian Zeeb,
Vice President Automotive

"For years, the digital transformation of retail has led to a completely new relationship with mobility - for example, how and when consumers get to a product and how and when a product gets to a consumer. Retailers are permanently optimizing their customer journey to make it even more convenient. At the same time, consumer demand for sustainable retail mobility is increasing due to growing social awareness of the need to reduce CO2 emissions. Whether a product reaches consumers sustainably will play an increasingly important role in their purchasing decisions.

Consequently, the four scenarios result in a variety of different impacts for retailers. Although some of these impacts differ from scenario to scenario, there are certain key points that apply to all scenarios. One of these points is the need for greater flexibility in their assortments.

Technology and available data now allow retailers to be much more flexible in adapting their assortments to include, for example, regional goods that are only available at certain times and locations. One of the key priority actions for European retailers is therefore to build lasting, sustainable alliances and create ecosystems in this area."

Nora Preisker,
Head of Enterprise Transformation Germany

"Zero-emission logistics is considered to be one of the most impactful solutions in the fight against climate change, given that the transportation sector is one of the largest emitters of greenhouse gases. In recent years, the transportation and supply chain industry has been heavily exploring potentially scalable green tech alternatives which can be introduced to their operations in road, ocean, and air freight. The recent investments in e-mobility and other alternative drive technologies such as hydrogen have just marked the beginning of decarbonized transport and will remain a key priority throughout the next years. In line with the trend on urban reset, logistics companies are tasked by cities and equally demanded by customers to rethink the transport of goods within dense and crowded areas. This will challenge well-established network strategies and business models. New delivery forms such as crowd delivery, autonomous fleets consisting of drones, robots, & delivery vans are at the horizon and will pave their way into the lives of the always online, always on the move, modern, global citizen. It remains to be seen how the demand for sustainable logistics will materialize when the current prevalent customer expectations of same day delivery and free shipping will remain.

Over the next decades, green tech will be one key priority for the logistics and transportation industry to make their contribution to a sustainable future.

Large investments, publicly and privately funded, are needed to ramp-up R&D and innovation efforts as well as production capacity to satisfy the growing need for sustainable aviation fuel (SAF) and sustainable marine fuel in the mobility and transportation space. Needless to say, the next generation of green tech must produce lower or zero emissions, but in parallel has to ensure environmental performance, commercial viability, and operational feasibility – all requirements which are only partially met by the current available technologies. Governments and regulators are in the driver seat to provide effective incentive schemes for the industry to guide their innovation efforts and come up with truly sustainable solutions and services. Additionally, in a traditionally highly fragmented industry only a joint effort will lead to success, calling for strong collaboration between customers, supply chain professionals and material scientists to jointly embark on this transformation journey."

Michel Heck, Senior Consultant
Enterprise Transformation Germany

"The future of sustainable mobility will be built upon digital products and services, fueled by data. To achieve acceptance of these solutions and embrace change, trust and security will be critical influencing factors. As an example, already today, connected cars generate around 25 GB of data per hour and rise of autonomous driving will significantly increase this even further. Trust in this case requires transparency. Individuals need to fully understand which data is processed or shared for which purpose, even for data not governed by data privacy regulations such as GDPR. Likewise, products and services need to be built secure by design, assuring that data is safe from exfiltration, and systems are protected against tampering and manipulation."

Christian Schmidt-Brockhoff, Director
Enterprise Transformation Germany

"The public sector must act as a role model when it comes to sustainability – and sustainable mobility. It must also set the right framework for sustainable mobility concepts of the private sector to flourish. Both require solid data to make the right decisions, for example on emissions for certain vehicles, industries, and in certain geographic areas. Hence it is key to heavily invest in both data-collection points (i.e., in cities, on regional roads and on highways) and in the setup of a monitoring platform. This will enable stakeholders to track the effectiveness of taken measures and allow for timely adjustments."

Timo Graf von Königsmarck,
Head of Public Sector Germany

"Whereas the trend urban reset describes a paradigm shift on urbanization towards more sustainable urban areas impacting living, building, and shaping of spaces, this is very much true for the way of working. Realizing during the pandemic that ´remote work´ is actually ´working´ was one of the prerequisites for the urban reset. For example, the move towards hybrid working models, a split between working in the office as well as working remotely, created much more flexibility for commuting and work-related travel.

What is more, the move towards remote and hybrid working models is very much related to the driving force of Rethinking Living Spaces, as employees enjoy much more flexibility regarding their actual place of living and their company's location. Whereas today 56% of companies in rural areas have major problems in recruiting suitable professionals (Hans Seidel Stiftung: Fachkräftesicherung im ländlichen Raum, 2015, p.24) and almost 30% of employees define company location as important selection criteria for their future employer (**Gartner, Global Talent Monitor, 2017, p.13.) this trend might change significantly with a workforce enjoying the conveniences of an urban reset while working at a company fulfilling their need for purpose and an interesting job. Nevertheless, the contrary might also be the case with individuals finding their preference of living in the rural landscape with the option to work for companies in the urban reset.

Considering the "working" part in urban reset, living, building, and shaping of spaces needs to also consider work related aspects. These include:

- Options to work within the urban reset i.e. office space at home including an enabling infrastructure with reliable security
- Company real estate adapted to a hybrid workforce i.e. potential of less office space per employee supported by an intelligent office management software
- Office spaces considering fewer single offices but more options to meet, co-create and exchange i.e., a building set-up that can be easily adapted while hosting the technology to work in a hybrid modus.

Finally, as offices do not necessarily need to be close to major traffic intersections individual mobility concepts need to be developed according to different set-ups of workforce being present or not."

Iris Brückner, Director
Enterprise Transformation Germany

"There is no Planet B! We all have the commitment to look into any technology available to accelerate our pathway to net zero. Start-Ups will play an integral part to enable corporates to adapt fast and leverage break through "green" technologies which they can´t develop on their own today. Building a sustainable ecosystem of partners is becoming more important than ever before. Through our unique "venture client as a service" model we brought hundreds of new start-ups to our customers and built breakthrough POC´s in the space of sustainable e-biking/last mile logistics, to give you just one example. The e-bike market is growing CAGR +30% year over year and will massively influence the way we commute in and around modern cities. By leveraging data from modern electric engines, studying and influencing driving behaviour and sharing this data with all city ecosystem partners, we will further reduce the local carbon footprint and allow a complete new sustainable products and services!"

Jens Hofmeister,
Head of Innovation Germany

> One thing becomes very clear across all the highlighted fields and industries: the time to build our tomorrow is now. Let's get to it and invent our future! "The best way to predict the future is to **invent** it."
>
> **Alan Kay**

7 AFTERWORD: CALL TO ACTION

We are currently in the midst of a system change with significant consequences for our successor generations if we do not take action now. The mobility of the future must be sustainable, we know that from scientific studies, otherwise we will face devastating consequences for our planet. Nevertheless, no one can look into a crystal ball and know how innovative ideas developed today will develop into trends and which dynamics will influence them. But in any case, we can do something today to ensure that innovative ideas emerge and become trends by developing and driving them together for a new sustainable mobility system on our world. This trend analysis elaborated on nine trends on sustainable mobility for 2030: Urban reset, Well-being on the move, Mobility reasoning, Neo-politics, Green tech design, Data empowerment, Repurposed business models, Trust in mobility and Ethical mobility which we can bring to fruition in a huge community with different stakeholders, following all one vision to initiate a system change. "In fact, ecological, economic and social aspects play a greater role in mobility than in hardly any other sector. The basic prerequisite for a successful transition to sustainable mobility is therefore social acceptance and the close cooperation between industry, science and politics."[5] The mobility sector contributes significantly to climate change. We need to take "New Steps" today so that we can take "New Paths" tomorrow, so let's create the time for new ideas to become sustainable trends together!

Kiri Trier,
Senior Director
Innovation & Strategy |
Head of Sustainability

> Nothing is as powerful as an idea whose time has come."
>
> **Viktor Hugo**

[5] *Fraunhofer ISE, 2021, https://www.ise.fraunhofer.de/en/sustainable-mobility.html*

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