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Sustainable Mobility

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Summary

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Introduction

Introduction and objectives of the Roadmap report

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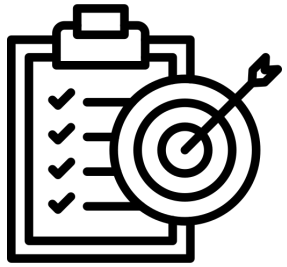
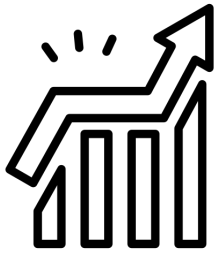
This report was developed as part of a broader initiative to identify and capitalize on market opportunities within the **Sustainable Mobility** sector. The report serves as a guide that maps out the market potential, challenges, and strategic actions necessary for the successful scaling of businesses in this sector.



The primary goal of the Sustainable Mobility Roadmap Report is to equip companies and stakeholders within the sector with the knowledge and tools needed to navigate the transition **towards more efficient, sustainable, and competitive market positions**.



Main function of the report is to highlight opportunities that the participating start-ups may have not recognised. It provides a structured approach to understanding market dynamics, customer needs, and emerging trends, thereby helping businesses position themselves effectively in the evolving marketplace.

Overview of the Participants

Ventures

Following the evaluations by the selection panel, 10 of the most promising European ventures in Sustainable mobility group were chosen through a competitive process. Companies were selected based on leadership potential, product/technology strength, market opportunity, go-to-market strategy, and business clarity.

alteva is developing technology to minimise the use of fossil fuels and advance our society towards a low-carbon economy.

Enersens produces the best thermal barriers and additives to improve safety, energy efficiency and flame protection.

We accelerate the transition to electric mobility by providing high-performance structural cooling solutions that optimize battery performance. Our technology enables 10-minute rapid charging, manufacturing cost reductions (-20%) and significant range enhancements (+7%).

KotiCharge streamlines EV charging with automated billing, real-time pricing, and energy optimization, helping housing communities cut costs, ease administration, and promote sustainable energy consumption.

Limatica develops a non-invasive solution for rapid quality assessment of batteries, focusing on intrinsic cell activity.

Qkera is developing battery tech with no compromise on performance, manufacturability and cost - truly unlocking next-generation batteries for mass market applications.

Sincroll is developing and commercializing its patented gear technology in mechanical engineering, selling licenses and know-how, also advisory, design and prototyping services.

SOLiTHOR is world leader in the development and commercialisation of safe, clean and environmentally friendly rechargeable all-solid-state lithium battery technology for the electromobility sector.

Vaeridion is revolutionizing regional air travel with ultra-efficient, electric airplane for greener, and more cost-effective flights.

Vitirover manufactures and distributes Connected and Autonomous 4x4 Professional Solar Mower Robots to manage vegetation on industrial or agricultural land: vineyards, orchards, photovoltaic farms, racetracks, railway and highway borders, and American cemeteries.

Market opportunity Stakeholders

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Investors

Anchor Group

ayacapital.vc

Clear Corporate Finance BV

Corenvest

Energy Revolution Ventures

Fark Labs Innovation

First Imagine Capital Ltd

Future Energy Ventures GmbH

Lhyfe

Narwhale Ventures

SKYCORP Technologies

Vsquared Ventures

Lead Customers

CustomCells

Haropa Port

Market opportunity Stakeholders

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Network partners

Aalto University

ClassiusAI Oy

Data Privacy and AI

Hydrogen Europe

LMAX Global Business Consulting

Papula-Nevinpat

Sampo Accelerator

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CustomCells

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The High-EQ

Bruno Palma
Continental

Ph.D. Harry Michael
Energy Revolution Ventures

Christian Korte
Breathe Battery technologies

Ph.D. Christian Stumpf
Nova Talent

Audra Elena Shallal
Flying Finn Angels

Methodology

Starting point

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We state here some of the underlying assumptions and 'facts' about the Sustainable Mobility sector that serve as the basis and context of this analysis.

- **Environmental Imperative**: Sustainable mobility is driven by the urgent need to reduce greenhouse gas emissions and air pollution, aiming to mitigate climate change and improve public health.
- **Technological Innovation**: Advances in technology, including electric vehicles (EVs), autonomous driving, shared mobility services, and smart infrastructure, are critical enablers of sustainable mobility solutions.
- **Behavioural Change**: Shifts in consumer behaviour and public attitudes are essential for the widespread adoption of sustainable mobility solutions. There is an assumption that individuals and businesses will increasingly prioritize environmentally friendly transportation options.
- **Urbanization Trends**: Rapid urbanization is assumed to continue, necessitating innovative approaches to urban mobility that can alleviate congestion, reduce pollution, and enhance the quality of urban life.
- **Transition to Electric Vehicles (EVs)**: The global market for EVs is growing rapidly, supported by technological advancements, decreasing battery costs, and increasing regulatory pressure to reduce emissions from internal combustion engine vehicles.

Methodology

- 5 in-depth interviews* were conducted with industry stakeholders using an AI tool to extract expert opinions across the following categories:

1. *Market trends and opportunities*
2. *Challenges and needs in sector*
3. *Key technologies and technology infrastructure*
4. *Competitive structure of sector*
5. *Risks for start-ups*
6. *Customer segments and distribution channels*
7. *Scaling and growth*
8. *Roadmap, i.e. evolution of sector*

- Surveys: Collected 10 survey responses to gather initial insights. The survey included 11 structured questions.
- Challenges queries for start-ups: We collected challenge statements from applying start-ups, and organized them by Market Opportunities and category, and analysed the interviews for expert insights for these categories of challenges.
- The gathered data was analyzed by focusing on key categories, identifying strategic opportunities and potential barriers. The analysis provided a comprehensive view of the sector, enabling the development of targeted insights for growth and scalability.

5 Stakeholder interviews

10 Survey respondents

21 Stated challenges by applying start-ups analysed

Validation

Total of 20+ Participants

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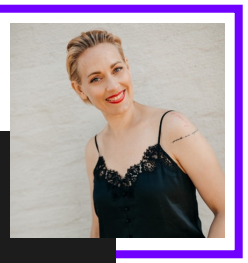
*) Two stakeholders did not provide permission to publish their information.

'image: Flaticon.com'. This slide has been designed using resources from Flaticon.com

Results, Insights, Roadmap

Opportunities, Market trends: Mobility sector is shifting, with more diversity and options in transportation, opening opportunities for start-ups. (1)

There are several trends in mobility that open opportunities for start-ups. **Rise of multi-modality**, **shift from private vehicle dependency**, and **increase in shared and micro-mobility** are all aspects of shifting mobility landscape. There are also systemic inefficiencies such as **infrastructure deficits** (e.g., lack of charging stations and hydrogen refueling points) and **personal vehicle usage challenges** (e.g., cars idle 94% of the time). Thus, there is potential for start-ups to innovate in these areas, focusing on behavioural shifts toward shared or alternative transportation models and aligning with public-private partnerships.

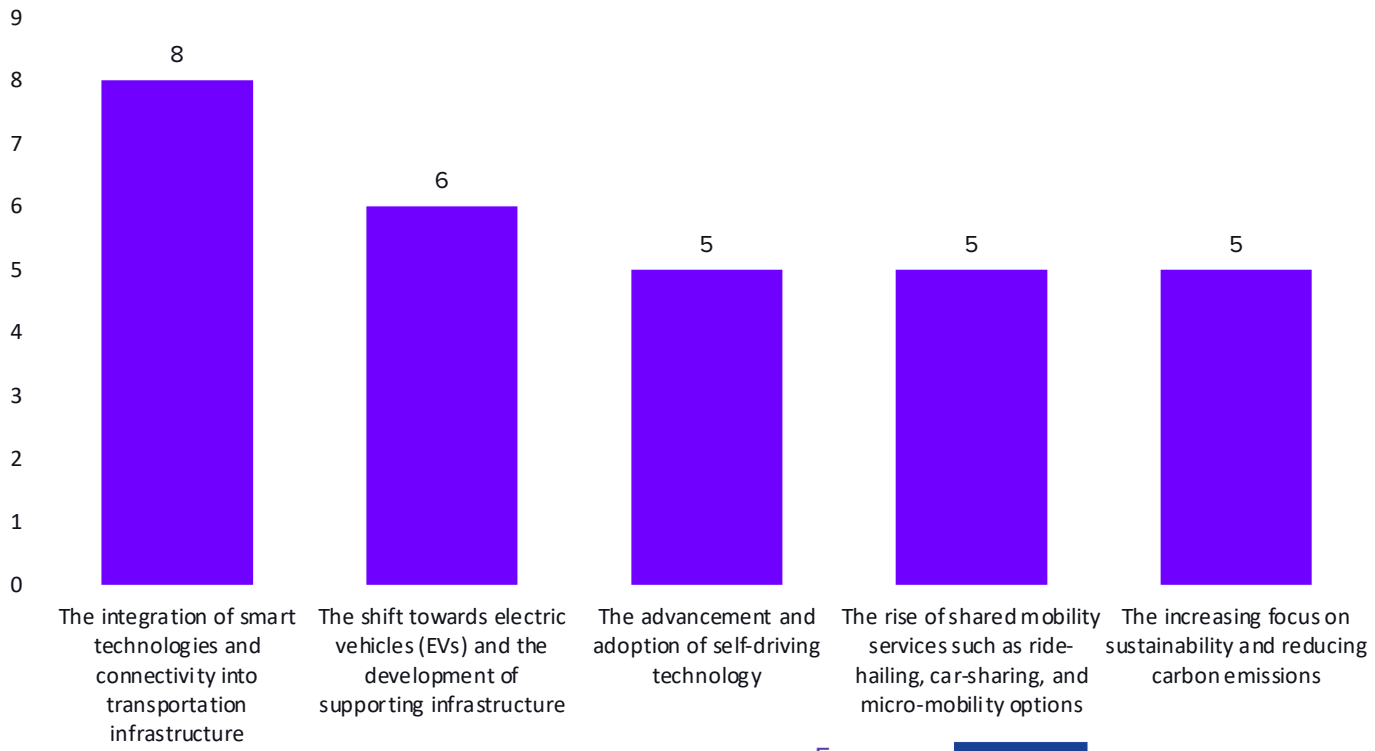


Krista Huhtala-Jenks

CEO, MAJ, formerly of Min. of Transport, Finland

"What I still see extremely potential is that how we can have what in the industry we call multi-modality. How we can actually start translating that into an appealing offering for consumers. And that's when we start seeing like a real change from our current car dependency."

*Which of the following **market trends** do you believe are most important for startups in the mobility sector?*



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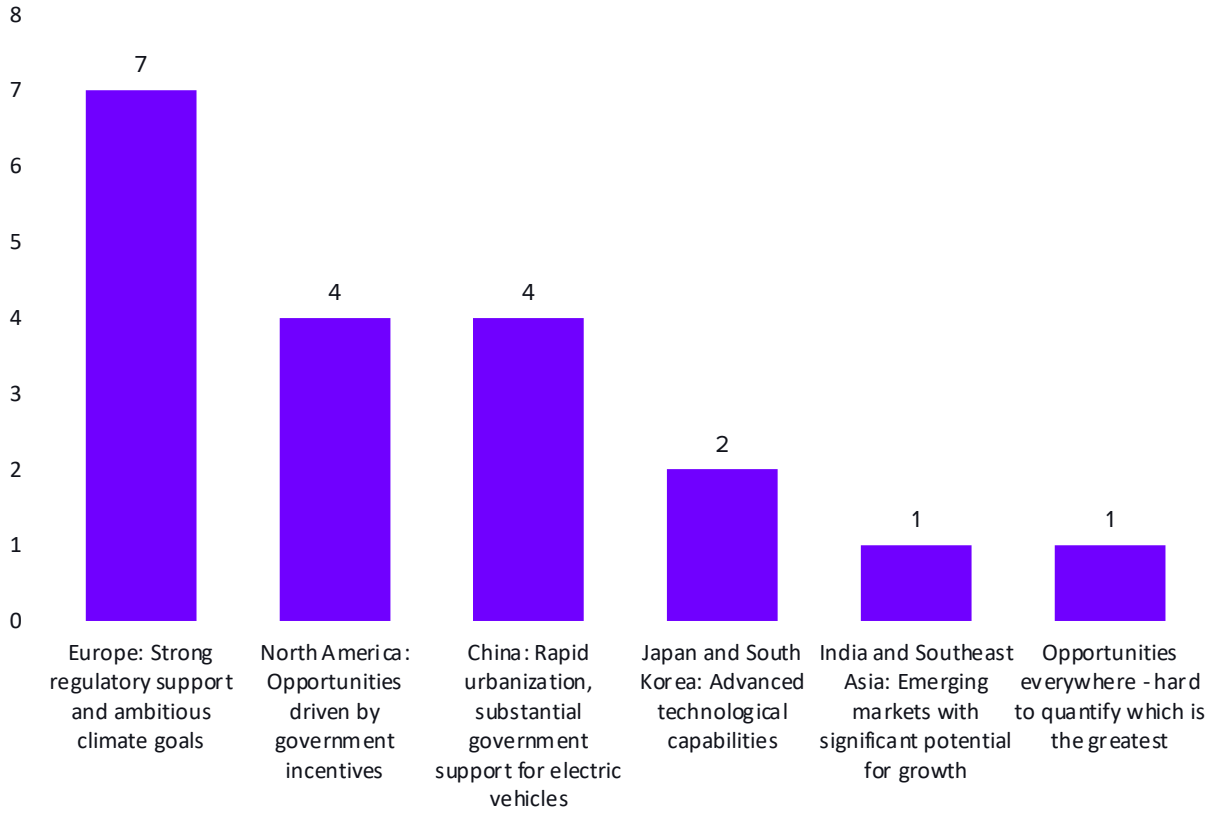
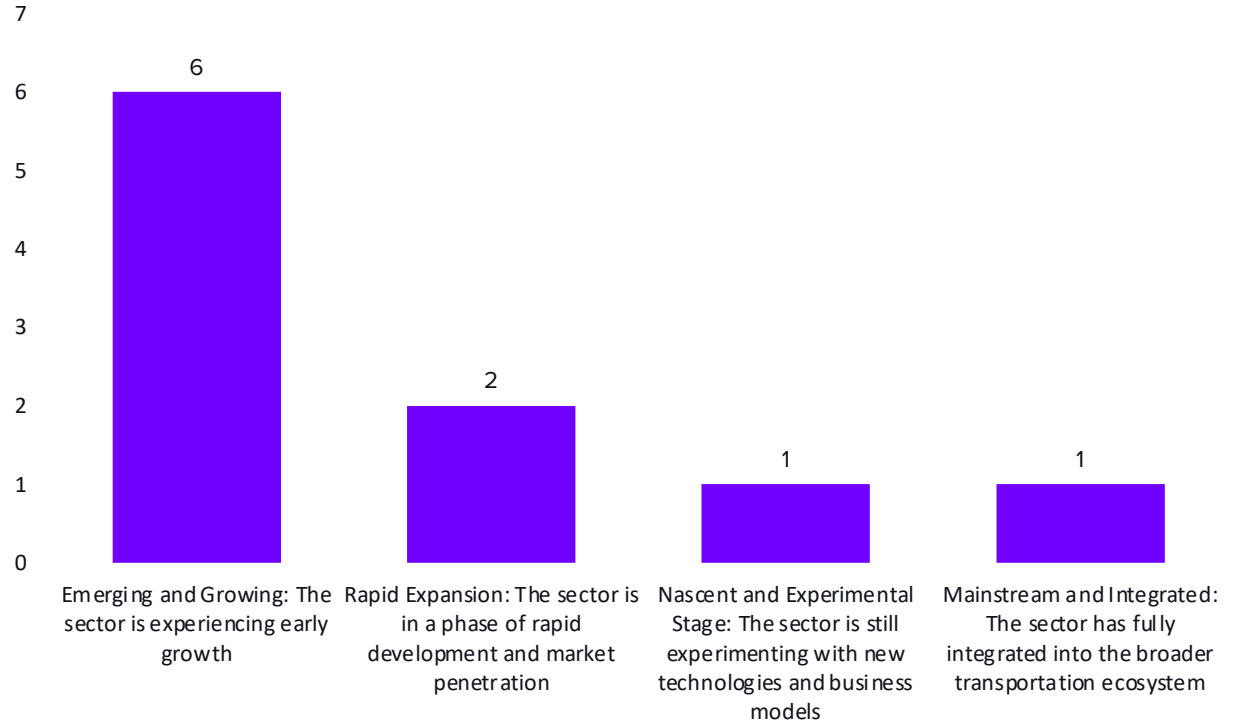
Opportunities, Market trends: Mobility sector is shifting, with more diversity and options in transportation, opening opportunities for start-ups. (2)

*In terms of geographic markets, where do you see the **greatest opportunities for growth** in the sustainable mobility sector?*



*What is the **state of the sustainable mobility sector** currently in its long-term evolution, in the European context?*



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Technology: A diverse range of technical solutions for future mobility, yet infrastructure is a core challenge

There is a diverse set of technologies that support sustainable mobility, each addressing unique aspects of environmental efficiency, infrastructure gaps, or consumer behaviour. Particularly infrastructure questions are prominent in the discussions about more sustainable mobility solutions of the future.

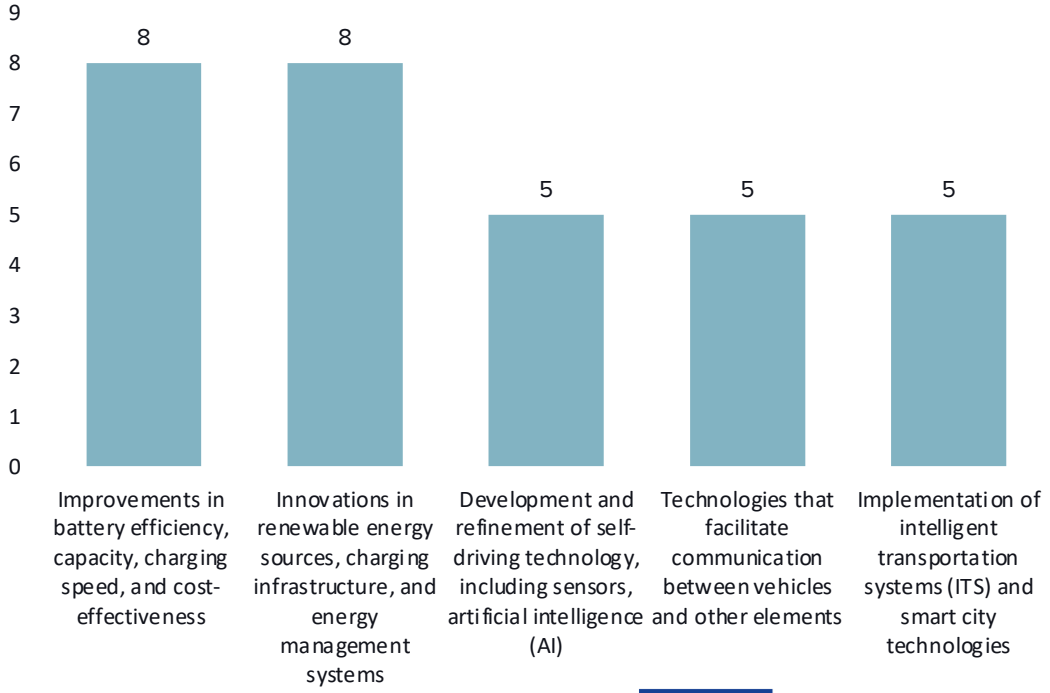
Electric vehicles	Significant part of sustainable mobility but infrastructure (e.g. fast chargers) scaling is a persistent challenge
Hydrogen technology	Promising future option, but infrastructure (e.g. hydrogen refueling stations) is even bigger infrastructure challenge than with EVs
Battery advance-ment	Crucial for growth of sustainable mobility, with focus on durability, speed of charging, lighter weight and ease of replacement
AI and multimodal integration	Promising for optimized routing, ticketing algorithms and improving appeal for shared mobility options
Vehicle-to-everything (V2X)	Tech to connect vehicles to energy infrastructure, and other devices, still requires updates in infrastructure for implementation
Autonomous vehicles	Potential future solution, yet with regulatory hurdles being key challenge for adoption
Battery swapping	Potential infrastructure solution to improve EV usability
Smart mobility apps	Can contribute to behaviour change, e.g. to encourage public transport or carpooling use, also to show sustainability metrics.

Marek Alliksoo

CEO, SKYCORP Technologies

"A lot of the sustainable mobility options depend on the infrastructure side: having enough fast chargers, hydrogen stations, Zero Emission parking lots, vertiports and so on, but that's the part that is not yet properly scaled, because "ease of use and connected use" are those off-take keywords and we're still not there."

*Which of the following **technology needs** do you think are critical for the future of the mobility sector?*



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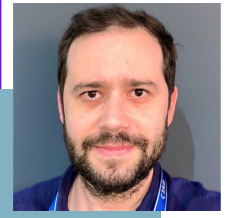
Scaling: Sustainable mobility is a growth area, yet the existing real demand is constrained particularly by infrastructure challenges (1)

There is significant potential for growth in the area of sustainable mobility, opportunities particularly related to infrastructure, innovation in business models, technology, and collaboration. Also, areas of regulation and funding need to be addressed, to foster viable business models in this area.



Raúl Urbano Escobar

EU Project Manager, CTAG - Automotive Technology Centre of Galicia

”For example, public transportation or charging stations, where perhaps a company, a startup, doesn't reach or doesn't have the capacity, doesn't have the resources, and has to align itself, has to work hand in hand with a bidder - large companies that are the ones that have the tenders, right? ”

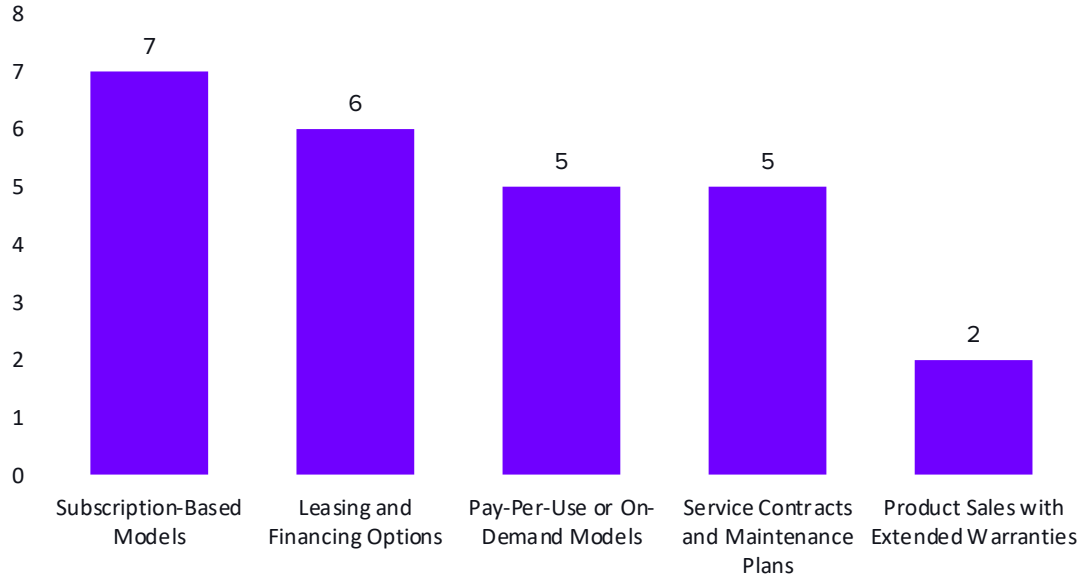
Infrastructure and Accessibility: In some areas there is a problem of (primarily economic) access to infrastructure – which the start-ups could solve with novel technical solutions

Collaboration and Ecosystem Understanding: In mobility there is a need for start-ups to understand well the whole ecosystem, and to create relationships to provide services.

Innovative Business Models and Technology: Start-ups need to be clear on their business model, and whether they target cities, citizens or other actors.

Optimizing Mobility Services: Multimodality is one key part in sustainability, in order to make it appealing to swap personal vehicles to more sustainable options in mobility.

*Which types of **revenue models** do you find most sustainable or appealing, given the current market conditions in the sustainable mobility sector?*



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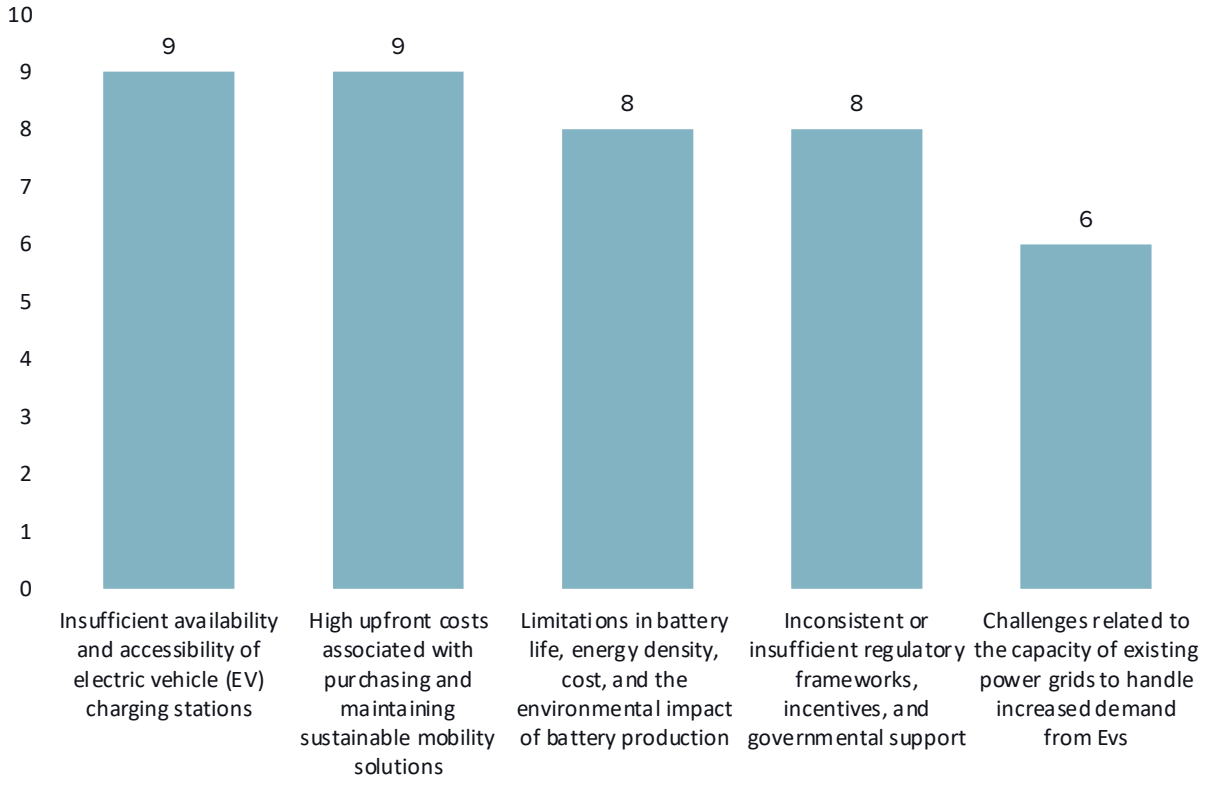
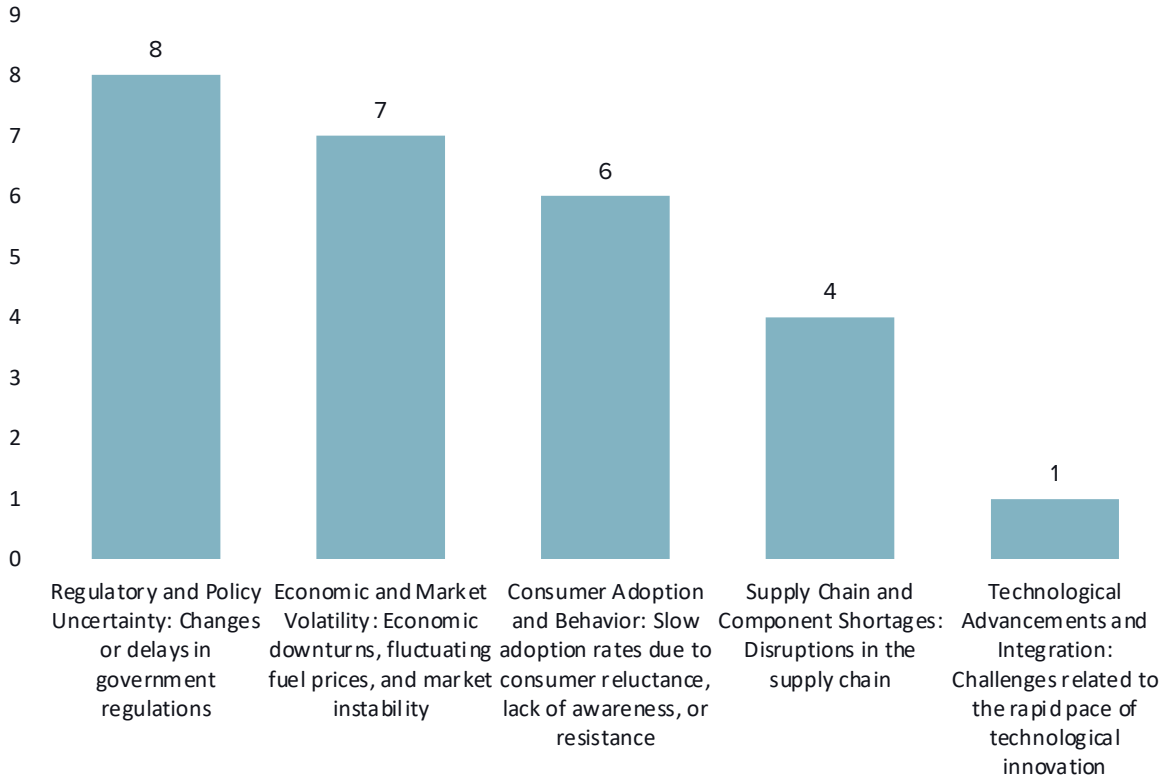
Scaling: Sustainable mobility is a growth area, yet the existing real demand is constrained particularly by infrastructure challenges (2)

*What **areas** in the sustainable mobility sector there are **still needs or challenges** that are not adequately solved or provided for?*



*What do you consider to be the **key risks** that could impact the sustainable mobility sector in the next 3–5 years, particularly in the European context?*



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Competition: Mobility is dominated by large firms, yet the ecosystem is expanding rapidly

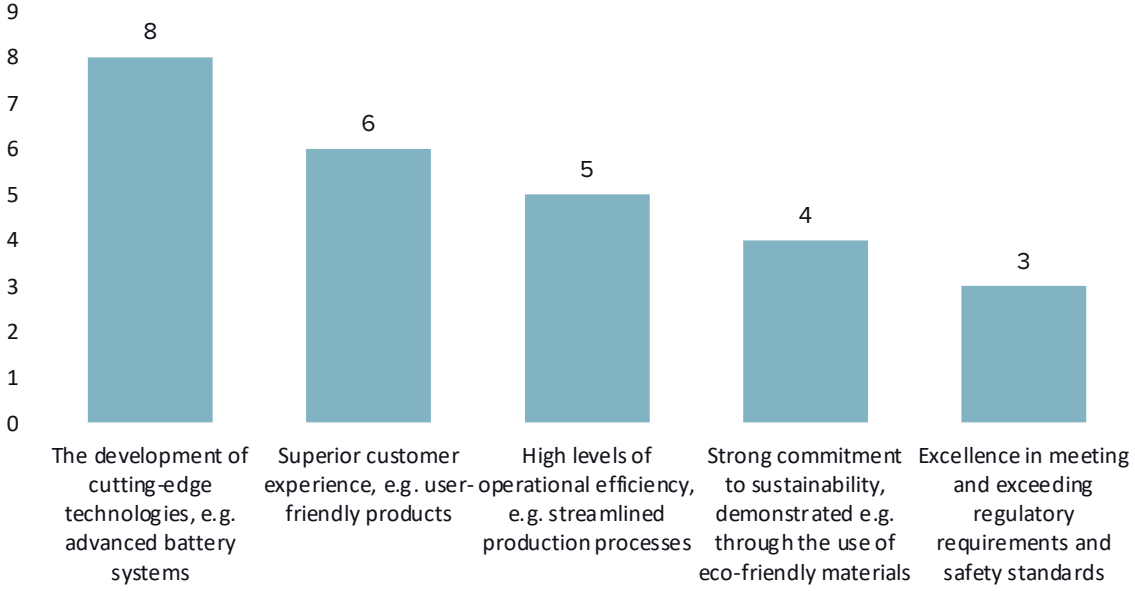
Mobility is a **rapidly evolving, competitive sector** with diverse players, strategic differentiation needs, and regional dynamics that influence its evolution towards greater sustainability. As there is a rapid development of electric vehicles, the **ecosystem of companies in the sector is also expanding fast**. The **impact of large companies**, especially of the automobile industry, may have hindered the emergence of new companies. However, there may be **opportunities in more niche areas.** As global competition increases, **collaboration among companies in Europe** becomes progressively more important. Shared mobility, as a solution to cut dependency on private vehicles, is one example of an area of mobility that appears of low competition - if you can crack that.

Marek Alliksoo

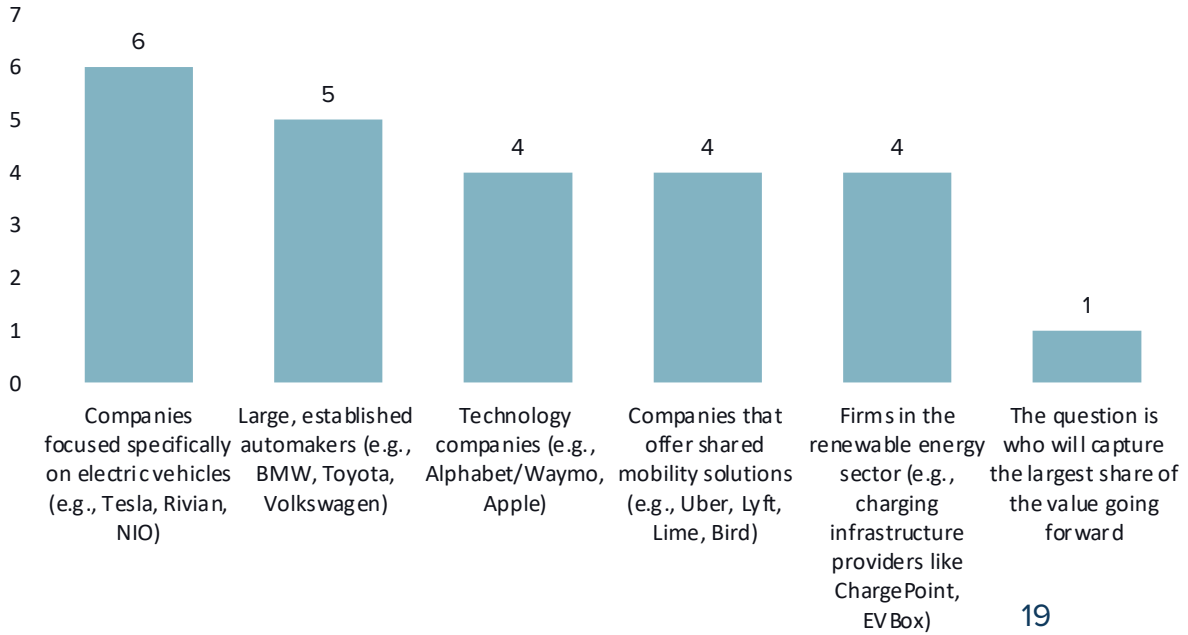
CEO, SKYCORP Technologies

"Companies need to start collaborating, growing together and then being competitive enough to not get eaten up, get bought up or go bankrupt anymore and Europe of course has to also develop that, fund it, be more risk averse for example, and do it quicker and just let companies test and innovate before over regulating."

*What specific **attributes or capabilities** do you look for to indicate a **competitive advantage** in the sustainable mobility sector?*



*What is the **competitive structure of the sustainable mobility** sector, i.e. who dominates the sector?*



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Challenges and risks for start-ups in sustainable mobility: Several challenges persist

Several challenges highlight the complexity of the mobility sector and underline the importance of strategic planning for start-ups looking to navigate this industry.

Capital intensity and access to funding

Start-ups need funding especially in early stages before evidence of traction.

Regulatory hurdles

Start-ups need people around them that understand the highly regulated landscape.

Market entry barriers

There are protective tendencies among legacy players and legacy systems.

Political uncertainties

Is there a possibility that Europe reverses its ambitions in shift to electric mobility?

Infrastructure and technology scaling challenges

Infrastructure deployment behind technology capabilities.

Sustainability risks

Sustainability considerations should take into account how is the energy generated.

Procurement and partnerships

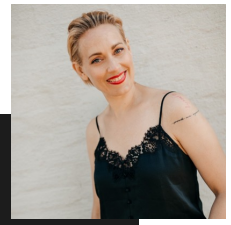
Procurement may be challenging, but low risk means for pilots exist.

Consumer behaviour and acceptance

Changing behaviour may be hard, it requires considerable marketing power.

Competition pressure

Competition is extensive, from public monopolies, to large incumbent companies.

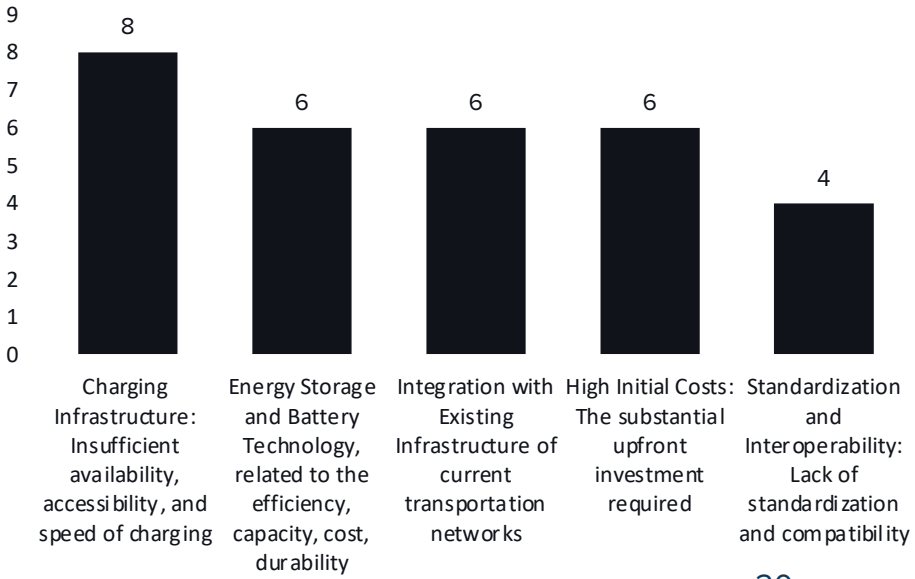


Krista Huhtala-Jenks

CEO, MAJ, formerly of Min. of Transport, Finland

"I think that this is one of the biggest issues that you have such a history of having legacy players, legacy systems, legacy infrastructure, legacy technology and legacy monopolies that even new players when they go on a slightly bigger roles or largest shares in the market that they start adopting the old ways of the market"

*What are the **main technological or operational challenges** that could hinder the adoption in the sustainable mobility sector?*



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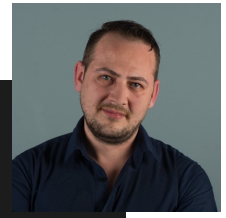
Customer segments and distribution channels: Many potential clients exist, but relationship building a key to reach early trials before long procurement cycles

Success in sustainable mobility depends on effectively targeting customer segments with tailored solutions and navigating distribution channels through partnerships, pilots, and innovative methods to bypass traditional procurement barriers.



Marek Alliksoo

CEO, SKYCORP Technologies

"The other big group is logistics - land, air, sea. Any corporate, which has fleets or movement of goods, people within their value chain. The larger the gain, the more interest a sustainable mobility solution may have."

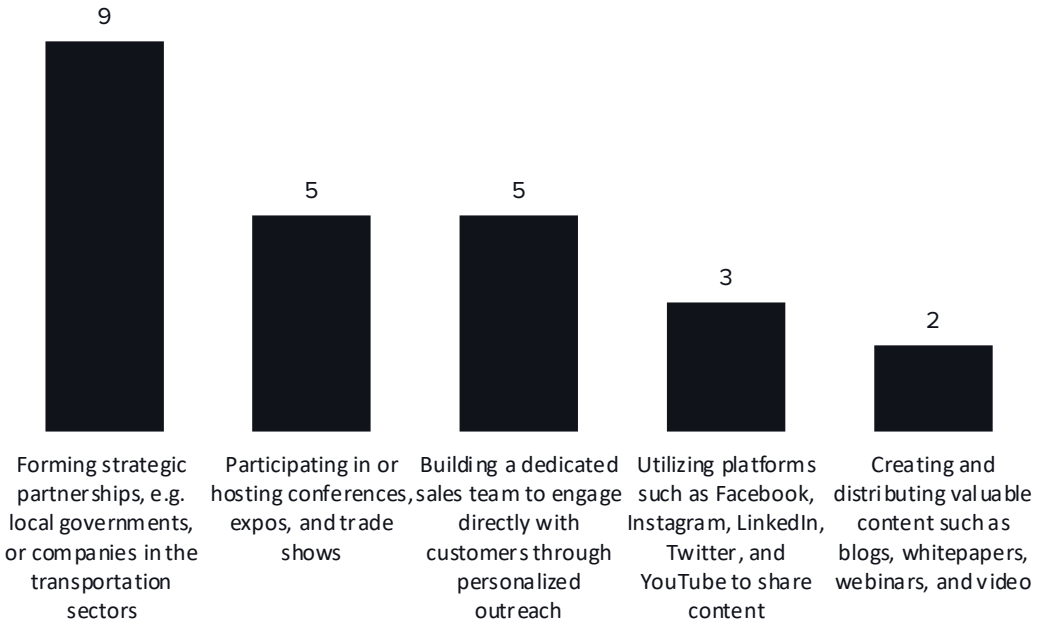
Customer segments

- Public sector, e.g. all cities, has sustainability goals, so there can be many buyers of these solutions.
- Logistics companies and any corporate clients with fleet (of land, air, sea) are another buyer group.
- Individual consumers may be clients with appealing solutions and marketing.
- For companies and cities the solutions need to fulfill sustainability and efficiency goals, while for consumers they need to align with their sustainability aims.

Distribution channels

- For public sector partnerships, should find partners for quick pilots, instead of going through procurement cycles.
- One validating city pilot can be a breakthrough validation for other cities.
- Build relationships with established players, such as corporations and other stakeholders. This can be done e.g. through accelerators, challenge programs, and incubators.

*Which of the following **channels** do you believe are **most effective for reaching and engaging customers** in the sustainable mobility sector?*



Roadmap: The evolution of Sustainable Mobility

Past

Infrastructure focus

- Before familiarity with mobile phones and other digital devices, the sector initially focused almost exclusively on infrastructure.
- Prior to 2000, there was limited digital integration and personal vehicle ownership was predominant.

Present

Wider EV use, but some pushback on regulations

- Electric vehicles (EVs) in use and gaining increasing attention, while Uber and Lyft push for shared mobility.
- Regulatory push for greener technologies.
- EVs, shared mobility, and micromobility solutions are widely discussed, but vested interests challenge adoption
- Pushback against sustainability targets such as ETS2 regulations, and the ban on internal combustion cars in 2035

Short-term Future

Scaling in the Next 5-10 Years

- The sector will focus on scaling technologies and infrastructure and addressing regulatory hurdles.
- Technologies like AI are expected to enhance routing and ticketing systems to reduce car dependency.
- Multimodality expected to grow in appeal
- Acceleration of deployment, supported by regulatory sandboxes.

Long-term Future

AVs, infrastructure and regulatory development

- Autonomous vehicles (AVs) and infrastructure upgrades are expected to dominate longer-term growth.
- Transformative changes powered by technology and regulatory developments, including fully autonomous travel and green energy integration.
- ‘New hype cycle’ may bring new transport modes and massive infrastructure investment.

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Challenge-to-Action Framework

Challenge Description	Category	Start-ups with the challenge	Mentor & Stakeholder insight	Start-up action plan
Finding capital and suitable partners	Funding	12	Target strategic VCs who can offer more than financial support. Collaborate with large corporations through innovation programs and accelerators.	Specialize in strategic investors and challenge programs, focus on integrated partnerships, and prioritize showing measurable impacts aligned with sustainability goals.
Our main challenge is to gain visibility on an international level.	Visibility	1	Form strategic partnerships, esp. with larger companies, through mechanisms like open innovation programs. Outputs like white papers can build trust with investors and clients.	Build credibility with success stories, leverage strategic partnerships, join innovation programs, and specialize in impactful, sustainability-driven value propositions.
Tender Connections: Establishing connections with other major vendors to collaborate on public sector tenders, especially in the road authority domain.	Partnerships	2	Leveraging "open innovation" programs from large companies and participating in hackathons or innovation tenders were identified as effective ways to connect with major vendors.	Form partnerships early with integrated third parties, utilize innovation programs or pilots, and demonstrate clear value aligned with stakeholder needs.
Data Bottlenecks: Overcoming slow processes in obtaining and integrating data from public sector entities, which is crucial for timely project execution.	Data	1	Need for regulatory sandboxes or living labs to streamline testing and validation processes for innovative solutions.	Partner with public sector organizations for pilot projects, leveraging innovation tenders and regulatory sandboxes to validate and expedite integration of solutions.
We enter the industrial deployment step and we need money and staff	Resources	2	Seek funding from accelerators, incubators, and programs tailored to deep tech start-ups. For staff, build trust and credibility through partnerships.	Focus on securing strategic partnerships, showcasing measurable value (time, cost, environmental impact), and leveraging specialized funding programs and incubators.
Moving commercial operations to US, navigating through the US market ecosystem, building trust with American producers and distributors, and scaling operations to meet industry-specific requirements.	Operations	1	To build trust and establish credibility, the importance of demonstrating clear value is key, such as time, cost, and environmental savings, while aligning with industry metrics and regulations.	Engage strategic partnerships, prioritize regulatory understanding, demonstrate clear value, leverage pilots with integrated solutions, and align with sustainability goals.

Other Market Opportunity Roadmaps

Circular Models for Cities and Regions roadmap

Renewable Energy Production roadmap

Supply Chain Management & Trade Finance roadmap

AI-Powered Utility Management for Sustainable and Smart Cities roadmap

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Rob Connell

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