



Sustainable Freight Transportation Roadmap report

Publication date: 31 October 2024

Summary

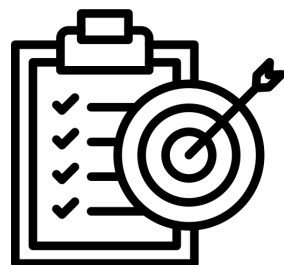


1. Introduction and objectives of the Roadmap report
2. Overview of the participants
3. Methodology and Starting point
4. Results, Insights, Roadmap
 - Market trends
 - Technology
 - Scaling
 - Competition
 - Challenges
 - Risks
 - Customer segments and distribution channels
5. References
6. Authors

Introduction

Introduction and objectives of the Roadmap report

This report was developed as part of a broader initiative to identify and capitalize on market opportunities within the **Sustainable Freight Transportation** 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 Freight Transportation Roadmap Report is to equip companies and stakeholders within the sustainable freight transportation industry with the knowledge and tools needed to navigate the transition towards sustainable practices.



Main function of the report is to highlight opportunities that the participating startups 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



Gelectic - is a pioneering maritime IoT startup dedicated to driving efficiency and sustainability within the industry.



HSL Technologies- start-up that developed HSL Solutions (Hydrogen Stored as Liquids), which is an easy way to transport and store hydrogen.



EYEGAUGE proposes a unified fleet data platform for maritime transportation that consists of data collection, data unification and data insights layers.



Clearly - Clearly harnesses AI across value chain to enable global transportation to reach net-zero emissions



DMSLOG.AI - AI for Smart Port Transformation and Decarbonation



Following the evaluations by the selection panel committee, 10 of the most promising European ventures in Sustainable Freight Transportation 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.



Sakowin is an eco-conscious deeptech company founded in 2017, producing decarbonized hydrogen through methane plasmalysis. Sakowin's technology is CO2 negative or neutral.



Sealution provides innovative connectivity solutions for the maritime industry.



Spark e-Fuels is a climate tech start-up tackling aviation's significant environmental impact.



Syroco is a Climate Tech startup that supports the energy transition of maritime transportation by providing fleet operators, cargo owners, naval architects and shipyards with a platform to evaluate and improve the efficiency of ships.



Naco Technologies - Empowering hydrogen systems through nano coatings to prevent corrosion at 30% less cost compared to traditional approaches.



Elonroad - Automatic charging while driving or parked

Market opportunity Stakeholders

European
Innovation
Council



Funded by
the European Union

Investors



Emerald Ventures



MONDRAGON Centro de
Promoción, S.Coop.



ninepointfive

Ninepointfive Tidal



Nine Realms



ORANGE BUSINESS
IMPROVEMENT



Prequel Ventures



Reefknot Investments



SWEN Capital Partners



Swiss Post Ventures



theDOCK



Volta Ventures



Lead Customers



Algeciras Bay Port Authority



Athens International Airport



Market opportunity Stakeholders

European
Innovation
Council



Funded by
the European Union

Network Partners

AELER

AELER Technologies



ALW Finance & Innovation



Estonian Maritime Cluster



Gate2Growth



Hydrogen Europe



Intent Communications



Marinnovators



Smart Freight Center



Terminal industry committee 4.0



The Captain's Table



Transition Finance Network



Wbird AB



Yilport Holding



30 DEGREES NORTH



Market opportunity Mentors

European
Innovation
Council



Funded by
the European Union



**Uffe Bundgaard-
Jorgensen**
Gate2Growth



Anne Lebreton-Wolf
ALW Finance &
Innovation



Estelle Linget
ESL.Consulting



Magnus Melander
Wbird AB



Boris Wenzel
Terminal Industry
Committee 4.0



Alexander van Os
Venture IQ

Methodology

We state here some of the underlying assumptions and 'facts' about the freight transportation industry that serve as the basis and context of this analysis.

- Freight transportation, as a key part of logistics systems, is an essential sector, that is relied on for a timely delivery of goods of all varieties, without which other industries would struggle in their own production processes.
- Freight transportation is a 'brownfield' industry, i.e. a sector whose practices have evolved over thousands of years.
- Freight transportation is an industry that relies on global networks, and significant changes to operating procedures will need to be coordinated across diverse actors.
- Freight transportation sector is a significant emitter of greenhouse gases, as the vehicles involved are still mostly powered by fossil fuels.

Methodology

- 5 in-depth interviews were conducted with industry stakeholders to extract expert opinions across the following categories:

1. *Market trends and impact*
2. *Competitive advantage and uniqueness (value proposition)*
3. *Customer segments and relevance*
4. *Channels and delivery*
5. *Revenue streams and financial viability*
6. *Risks and challenges*
7. *Competition*

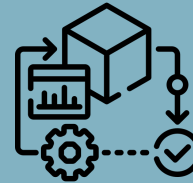
- Surveys: Collected 14 survey responses to validate and quantify the insights gathered from interviews. The survey included 13 structured questions.
- Business Model Analysis: 10 venture business model canvases evaluated to assess strategic approaches and innovation in the sector.
- Validation process involved multiple layers of engagement to ensure the accuracy of the findings. Initially, offline workshop was conducted with the Aalto advisory pool, consisting of business advisors, to gather feedback on the preliminary insights and roadmap format. Additionally, D2XCEL stakeholders were engaged, by providing the feedback on the final version of the report.
- 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



14 Survey responses



**10 Venture Business Model
Canvases analyzed**



**Validation through stakeholder
feedback and offline workshop
with advisory pool**

Total of 20+ Participants

Results, Insights, Roadmap

Opportunities, Market trends: Electrification, automation and measuring emissions are pushing the freight transportation sector towards sustainability – offering opportunities for start-ups (1)

Anne Leberton-Wolf

CEO at ALW Finance & Innovation



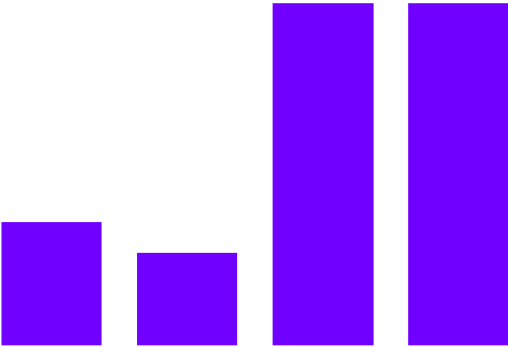
"Market trends: There are more and more players, but what is really key is to be able to work on a global level and to be able to deal with the whole chain. Ease of use for customers will be key on a longer term. There are a lot of reporting solutions on the market to measure impact related to fuel consumption, but on this I am a bit cautious regarding differentiating factors."

Wolfgang Lehmacher

Executive Advisor, Business Angel



"Supportive Environment: Particularly in regions like Europe, the regulatory framework encourages sustainability, creating opportunities for startups to scale by leveling the playing field and making sustainability economically viable."

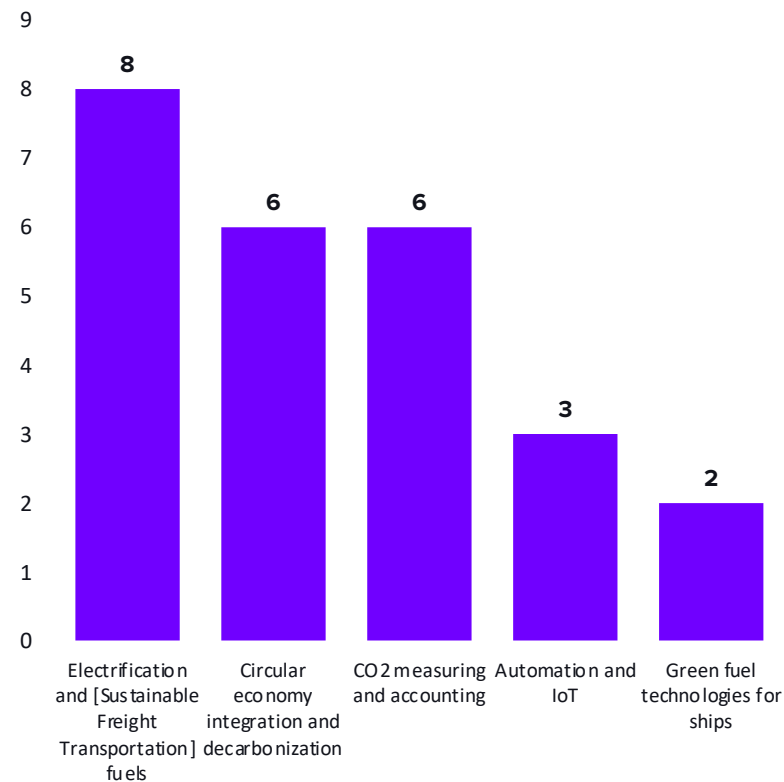


The freight transportation is one of the sectors that are strongly impacted by the **need to reduce greenhouse gas emissions**. **Regulatory push** towards sustainability will open up **opportunities for start-ups** in this sector to establish a foothold and **gain market share**, if they can offer well-designed services, particularly if enabling more sustainable processes. **Technological development** is another **factor** that presents **opportunities for start-ups**, as they have **lowered operational costs** as well as allowed **geographically extensive operations** even for small teams.

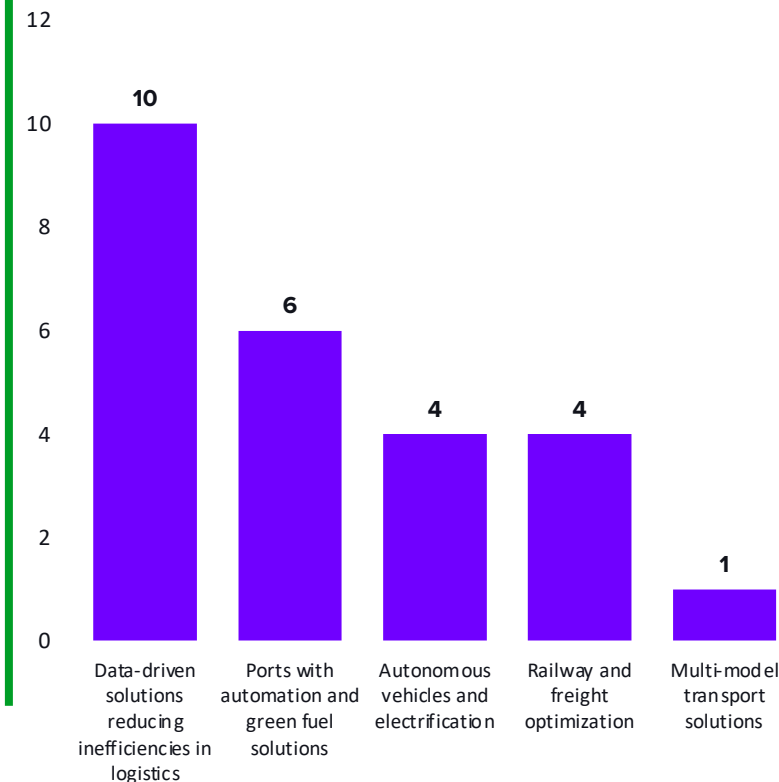


Opportunities, Market trends: Electrification, automation and measuring emissions are pushing the freight transportation sector towards sustainability – offering opportunities for start-ups (1)

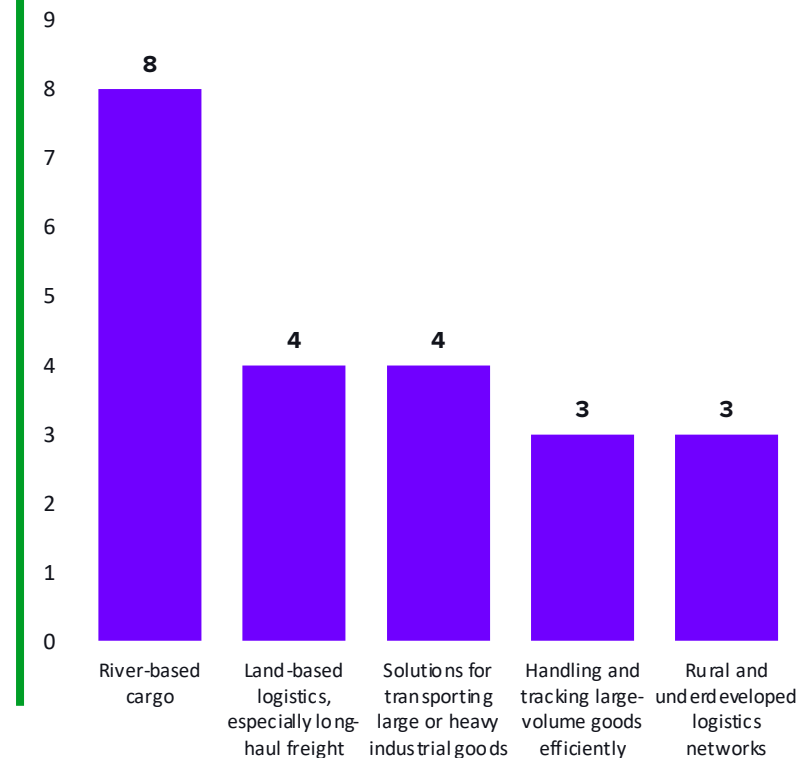
Market trends believed to be **most important** for startups in the freight transportation sector, based on survey responses.



Sectors within freight transportation considered to hold the **most promise for future growth** according to survey participants.

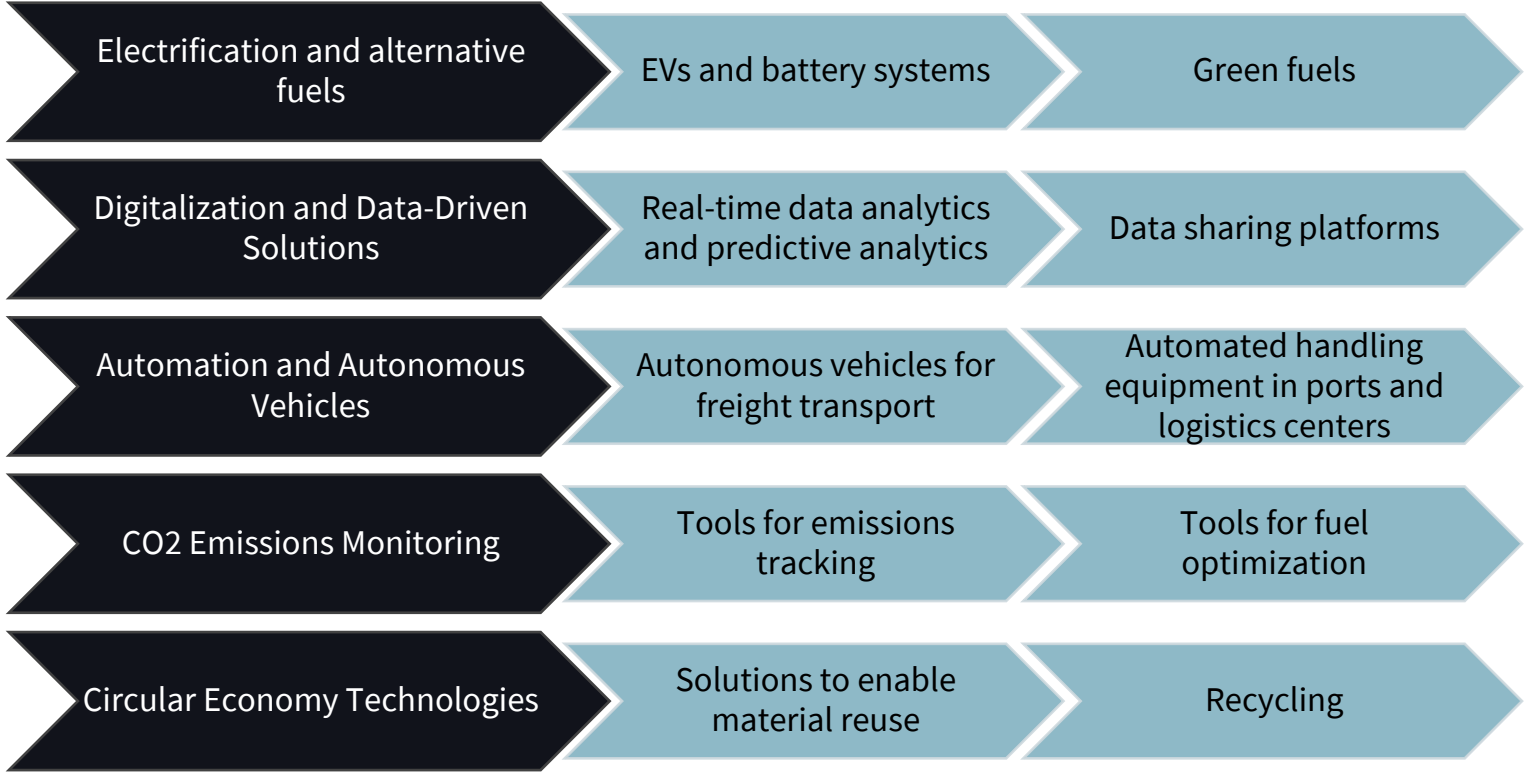


There are **underserved customer segments** in the freight transportation sector that **provide opportunities to start-ups**.



Technology: Electrification, digitalization, and emissions monitoring among the top developments towards sustainability (1)

While freight transportation is a **significant contributor to greenhouse gases** in the atmosphere, there are several **technological developments to support the industry becoming more sustainable, efficient and decarbonized.**



Matthias Bosse

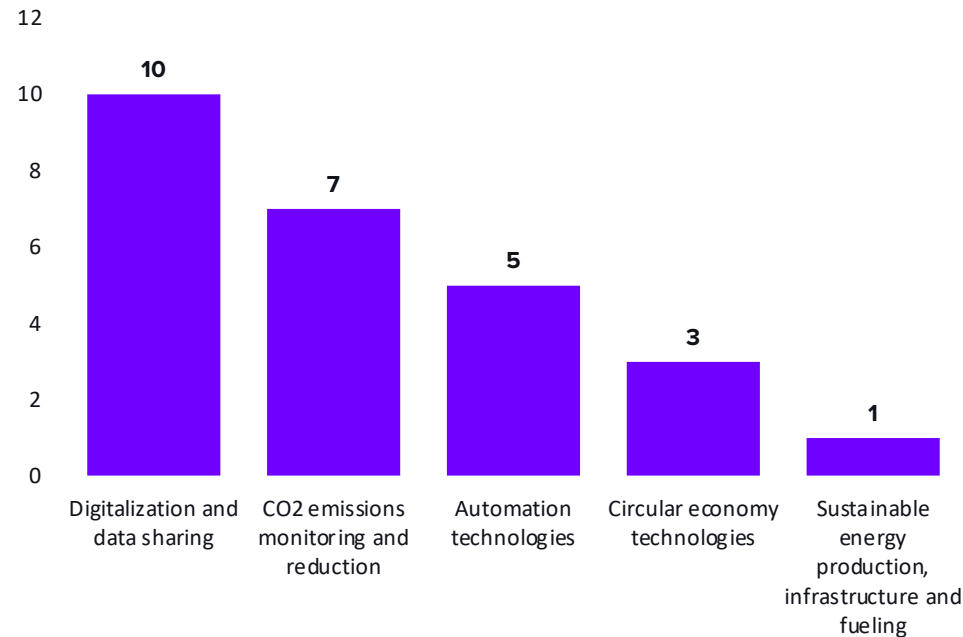
Founding Partner at Prequel Ventures

"Sustainable technologies, like electrification and alternative fuels, need significant infrastructure that is not yet widely available. Implementing sustainable solutions is capital-intensive, requiring substantial financial investments. Adoption also leads to complex operational changes."

Technology: Electrification, digitalization, and emissions monitoring among the top developments towards sustainability (2)

While freight transportation is a **significant contributor to greenhouse gases** in the atmosphere, there are several **technological developments to support the industry** becoming **more sustainable, efficient and decarbonized**.

Critical **future technology needs** for sustainable freight transportation.



Estelle Linget

Senior Advisor Transportation & Logistics at Roland Berger

“From a corporate perspective, a startup’s **value proposition must address missing technologies** in the market and be **mature enough** to work with large companies. Corporates are particularly interested in **technology solutions that fit their specific needs.**”

Scaling: Specialization, digital solutions, partnerships some of the key strategies for start-ups for fast growth in freight transportation sector (1)

How to position as a start-up for rapid growth in an industry that is increasingly focused on sustainability and innovation?



Focus on niche markets and specialization, providing tailored solutions



Leverage digital tools and data-driven solutions to optimize logistics and improve efficiencies



Ensure solutions are scalable and interoperable with existing systems.



Emphasize sustainability and circular economy as core value proposition



Form **strategic partnerships** with established companies



Adopt recurring revenue models, such as subscription-based or SaaS platforms, to ensure growth.

Gadi Benmoshe

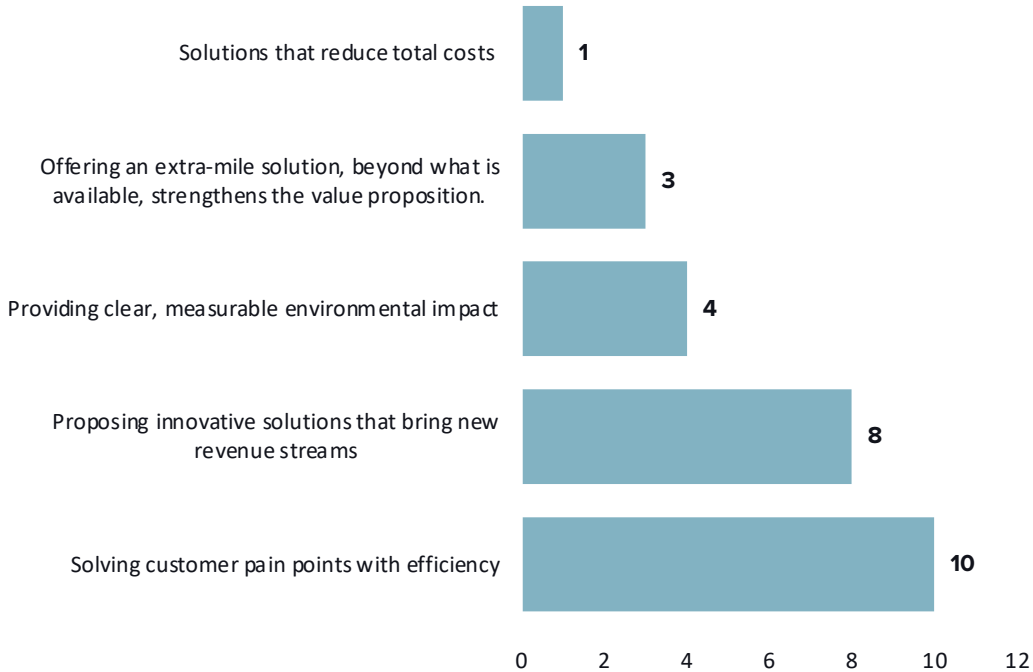
Managing Director at Marinnovators



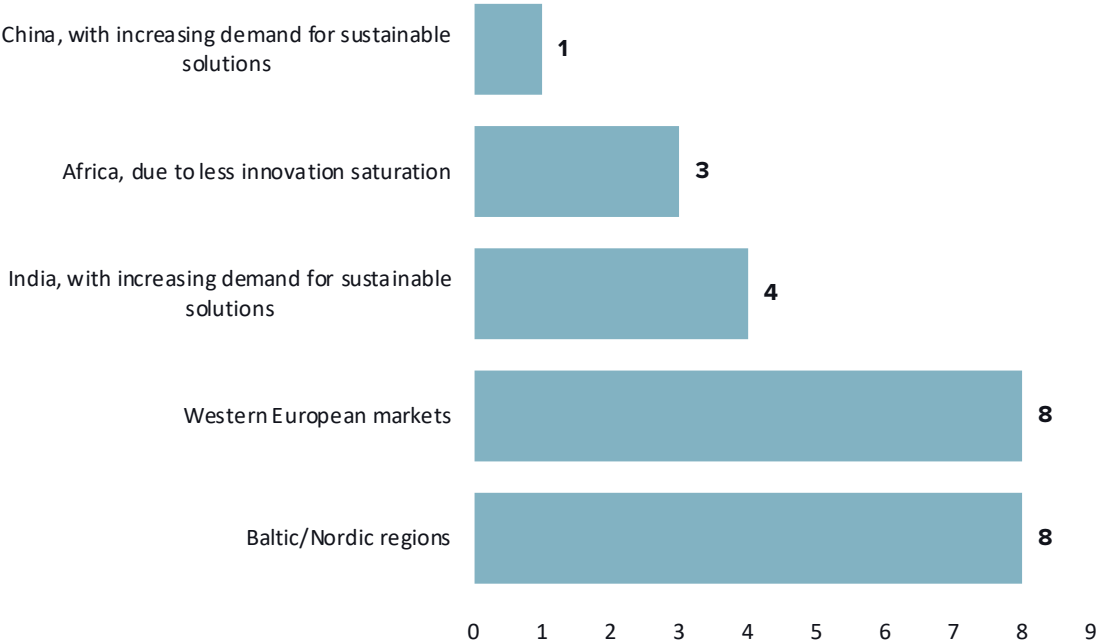
"The current state of scaling new products in the SFT sector faces many challenges, one of them is the conservative nature of the maritime supply chain. At IAPH, we're advocating for a mindset shift towards innovation, highlighted in our recent white paper (available [here](#)). We emphasize the importance of investing in startups, particularly focusing in their earlier stages."

Scaling: Specialization, digital solutions, partnerships some of the key strategies for start-ups for fast growth in freight transportation sector (2)

Factors making a start-up's value proposition compelling in the freight transportation sector.



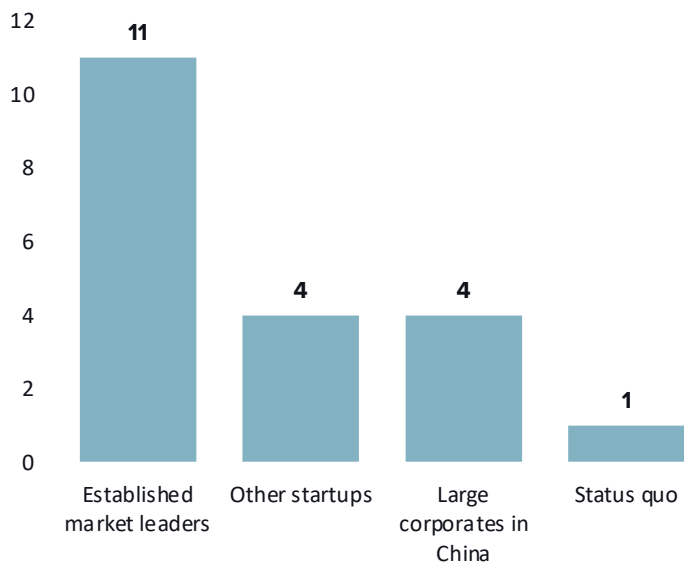
Geographic markets perceived to offer the greatest opportunities for growth in the Sustainable and Circular Construction sector.



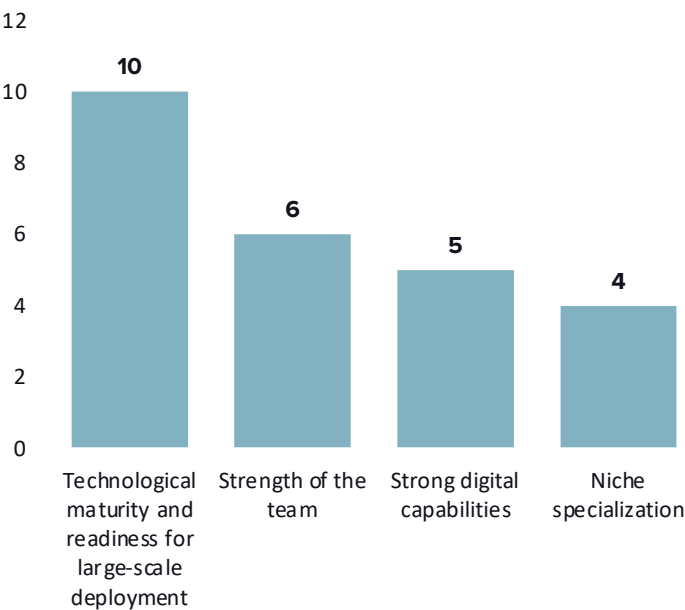
Competition: Freight transportation industry is dominated by established companies, but start-ups may have opportunities through specialization and the ability to act rapidly

While the freight transportation industry is dominated by the existing large transportation companies, targeting specialised needs and strength in digital capabilities can enable start-ups to challenge their competitors.

Main competitors for growth companies in the freight transportation sector according to survey respondents.



Attributes or capabilities identified as indicators of a competitive advantage in the freight transportation sector.



Wolfgang Lehmacher

Executive Advisor, Business Angel



"Big companies usually avoid smaller niche areas, so startups mostly compete with other startups, not large corporations.... In industries like textiles or waste management, startups may face competition from big companies if they go after high-volume, mainstream markets."

Contrasting competitive advantages

Large established companies

- Global reach, with extensive networks
- Financial resources
- Technological capabilities
- Strong market position

Well-funded tech start-ups

- Offer niche solutions
- Be agile (to act on technological development)
- Tailor innovative technologies to specific market needs

Challenges for start-ups in freight transportation and sustainability: Costs, infrastructure and uncertainties

The key factors slowing advancement towards sustainability stem from the complexity of the technologies involved, and the high cost for investment in them.

High cost of sustainability

- ❏ Decarbonization and alternative fuel infrastructure are expensive and underdeveloped.

Slow technology adoption

- ❏ Digitalization, data-sharing, and automation face slow uptake, limiting optimization.

Conservatism and fragmentation

- ❏ The industry's fragmented structure and conservative mindset slow down progress in technology and sustainability.

Infrastructure gaps

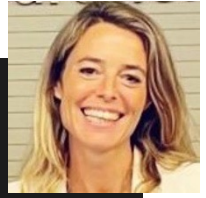
- ❏ Inadequate charging and fueling stations for electric vehicles and green fuels.

Regulatory uncertainty

- ❏ Complex, evolving regulations and the risk of losing competitiveness due to higher sustainability costs.

Estelle Linget

Senior Advisor Transportation & Logistics at Roland Berger








"Uncertainty about future energy sources (e.g., LNG, hydrogen, methanol) for ships and road transport is a major challenge. Companies are unsure which fuels to invest in for the long term."

While some of these problems, such as **infrastructure gaps and conservatism, have remained relatively consistent**, others—like those related to **sustainability focus, technology adoption, and regulatory pressures—have intensified and evolved** in response to external pressures and industry trends over the past several years.

Risks for start-ups: Scaling requires considerable financial resources, while adoption of new technologies may be slow

Start-ups face several risks in the freight transportation sector, requiring **careful risk management strategies**.

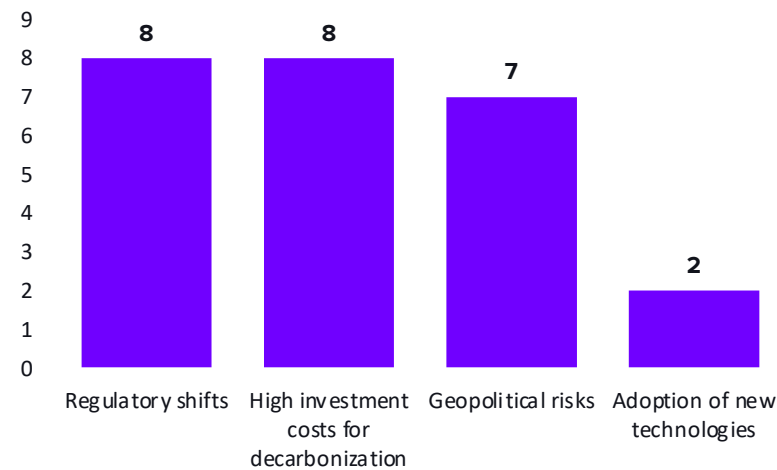
 High Capital Investment Requirements	Without sufficient financial resources or investment, start-ups may struggle to scale their operations
 Regulatory Uncertainty and Compliance	Changing compliance requirements create challenges for planning and execution
 Slow Adoption of Technology by the Industry	Convincing potential customers to adopt new technologies can be a long and resource-intensive process.
 Infrastructure Gaps	Disruptions or material shortages can delay projects and increase costs
 Competitive Pressure from Established Players	Shortages in skilled workers hinder start-ups' ability to develop and implement new technologies



Wolfgang Lehmacher
Executive Advisor, Business Angel

*"A **move** toward **more economically driven governance** could reduce spending on **sustainability**, but long-term **trends toward decarbonization** and environmental regulation are expected to continue. A **shift** towards more **regional supply chains and localized markets** could impact **global logistics** but may also create new opportunities."*

Key risks in the freight transportation sector in the next 3-5 years.



Customer segments and distribution: Freight transportation is highly formalized, yet the start-ups may find customers for new forms of fast, flexible and sustainable services.

The key customer segments represent diverse needs, from complex international logistics to flexible last-mile delivery, and the associated distribution channels reflect the variety of service models required to meet these needs in the freight transportation sector.

Large Multinational Corporations (MNCs)

- Engage through direct sales partnerships
- Engage through freight forwarding services, for end-to-end solutions.

E-Commerce Companies

- Serve through last-mile delivery providers
- Serve through integrated digital platforms that offer real-time tracking and fast shipping solutions.

Small and Medium-Sized Enterprises (SMEs)

- Reachable via digital freight platforms
- Reachable via local partnerships, for flexible, cost-effective services.

Public Sector Agencies

- Accessed through public tenders, and possibility for long-term contracts
- Public-private partnerships, for specialized services, e.g. for infrastructure projects.

Anne Leberton-Wolf

CEO at ALW Finance & Innovation



*“What works in SFT works elsewhere: **You have to convince your customers**, first at small level, prove it works and that it adds economical and impact benefits.”*

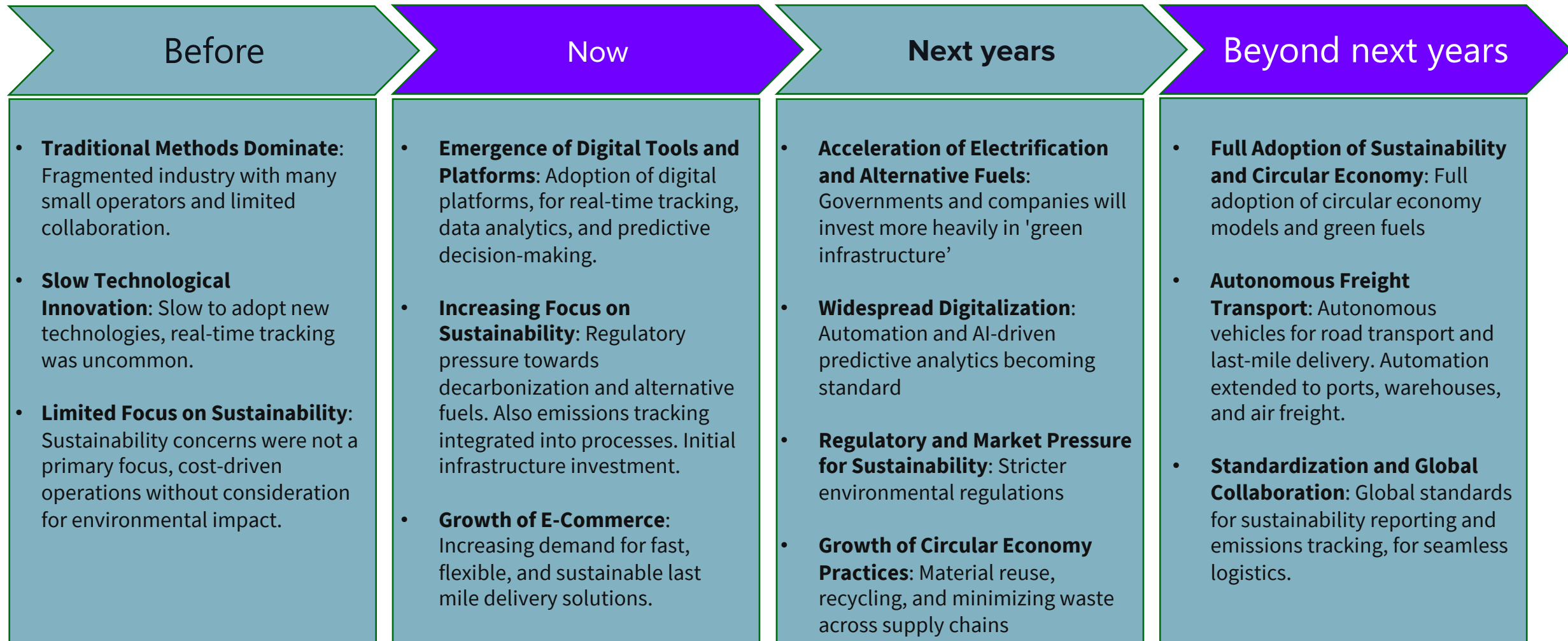
Wolfgang Lehmacher

Executive Advisor, Business Angel



*“**Avoid long-tail strategies:** Focusing on a few key customers instead of many small ones is more efficient for sustainable growth. ... **Target underserved customer niches, such as in-house logistics, and leverage sustainability regulations, particularly in Europe.** Prioritize market trends like digital solutions, circular economy practices, and data optimization for long-term success.”*

Roadmap: The evolution of the freight transportation industry



References



Aalto University
Startup Center

www.d2xcel.eu

References

1. [*Green Deal: Greening freight for more economic gain with less environmental impact*](#)
2. [*Sustainable Transport*](#)
3. [*Sustainable Mobility Data*](#)

Other Market Opportunity Roadmaps



Logistics Market Opportunity roadmap



AI-Powered Digital Services for Sustainable and Smart Cities Market Opportunity roadmap



Sustainable and Circular Construction Market Opportunity roadmap



Large-scale Stationary Energy Storage Market Opportunity roadmap

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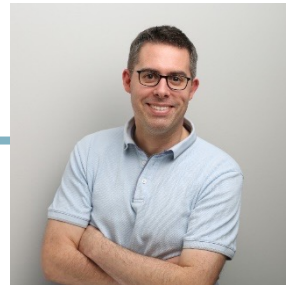


Interview participants



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THANK YOU!



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