Making streets safer together with cities

Safety Report
April 2023

voi.

Cooperation for Vision Zero

Voi is on a mission to rethink urban transportation to support sustainable cities by offering safe, sustainable and reliable micromobility for everyone.

Since we launched in 2018, over seven million riders have taken more than 150 million rides with our service. Over the past years, we have learned that safety is paramount for the industry's success, and it is a top priority for Voi.

Traffic safety is complex. Numerous factors affecting the risk of accidents are directly under our control as operators. There are also risk factors where we need city support. For instance, the safety of micromobility is heavily reliant on road infrastructure, requiring us to collaborate with cities to get things right.

Public-private partnerships are essential in the transition towards safer, more sustainable and livable cities. In this report, we aim to provide transparency on what we do to enhance safety, as well as our progress towards Voi's Vision Zero to achieve zero fatalities and severe injuries by 2030.

Hi Fredrik!

Fredrik Hjelm co-founded Voi in 2018 and has led the company since then. As our CEO, he is ultimately responsible for ensuring that safety remains a top priority.

You founded Voi with a vision of supporting living cities. How does safety fit into this agenda?
Our vision at Voi, which we share with many cities worldwide, is to make urban areas less reliant on cars. Heavy vehicles are the main hazard on our streets, and thus our vision is not only about making cities more sustainable but also safer. Shared micro-mobility is an essential piece of the puzzle in offering alternative transport options to reduce car usage in urban areas.

However, introducing new vehicles and making them widely available comes with safety challenges, particularly when new or inexperienced road users start using them. Therefore, as an operator, it is elementary for us to do all we can to educate users on road safety and how to ride our vehicles safely. After all, we work in traffic and just as safety has been a concern for automotive companies and traffic planners for decades, it is a top priority for Voi.

I personally believe all businesses, and especially the ones operating in "the real world" – not only digital – should put safety on top of their agenda. Several studies show the economic benefits of that, even when not accounting for the human tragedies that occur in for example mobility, healthcare and manufacturing when safety incidents take place.

Micromobility safety has been a contested topic over the years – is Voi doing enough to prevent accidents?
I am the first to admit that more can – and should – be accomplished to improve the safety of shared micromobility. That said, we have made significant improvements to ensure the safety of our service over the past few years. Safety permeates everything we do, from vehicle development to operations and marketing.

In addition, we have taken significant steps to strengthen our capacity to leverage different data sources and improve safety. We do this through in-house R&D and by collaborating with academia and other partners. For us, it is vital to take a data-driven approach to truly understand the critical safety issues and develop safer vehicles, operations, behaviours and streets.

Do you have any predictions related to micromobility safety for the coming year?
I hope and expect that more cities and government authorities will recognise the value of the data that operators can collect through sensors and user reports. As we explain in this report, there are many opportunities to use this data to improve safety and traffic flow in urban areas.

Most of us agree that urban space needs to be redistributed from cars to give more space for bike lanes and maintain these safely. Data from connected micro-vehicles can help inform decision-making for creating tomorrow's safe, sustainable cities.

The industry still faces safety-related challenges, which are best solved through close collaboration with cities. Data sharing and cross-sector partnerships are essential to fulfil the true potential of shared micromobility.

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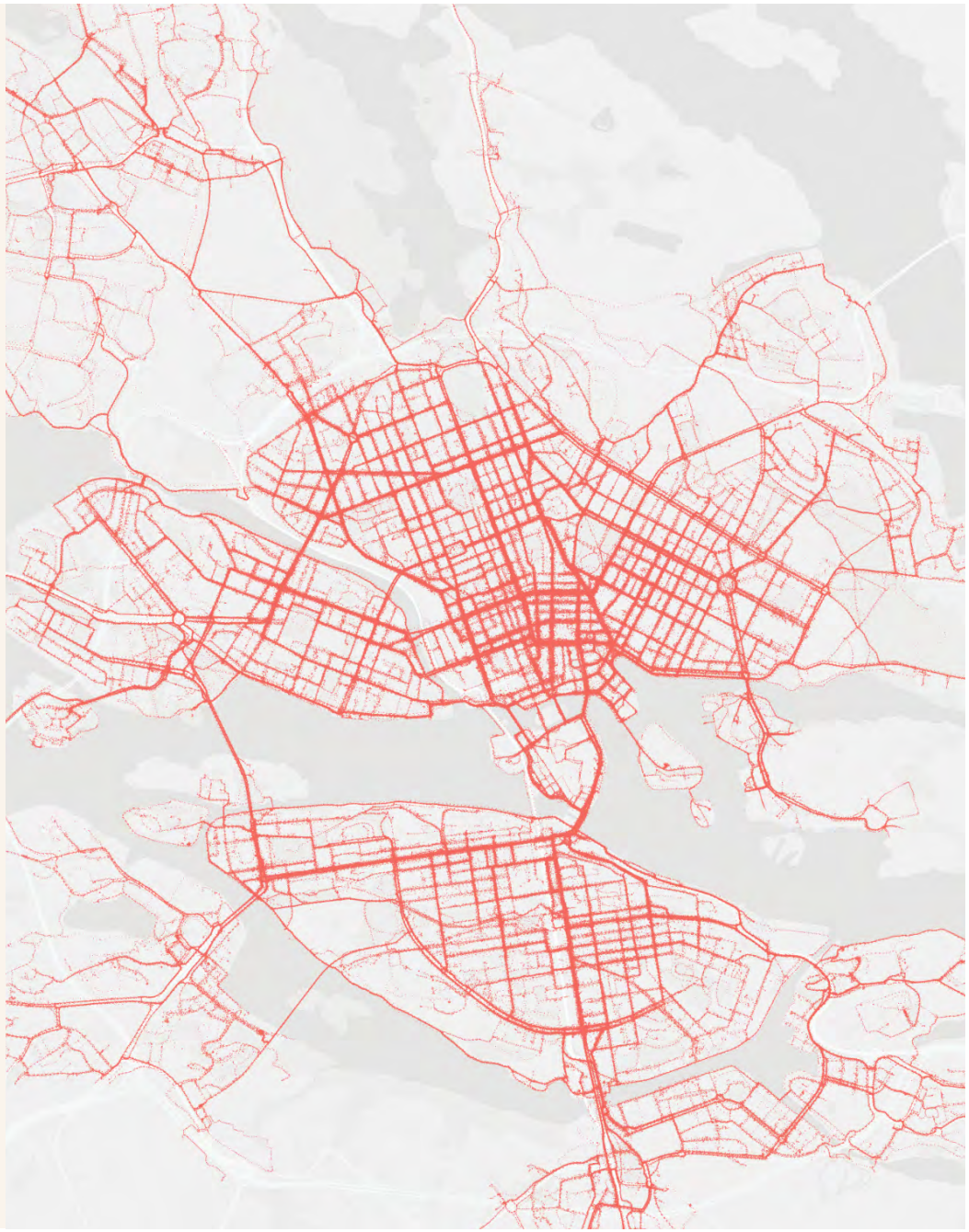
Let's get it right

STRATEGY

Data-driven decisions for Vision Zero

Voi has structured processes to identify and implement solutions to build the safest micromobility service on the streets. By gathering and analysing rider and accident data, we make informed decisions to mitigate risks and improve safety for all.

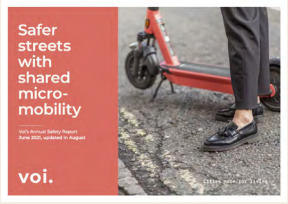


Safety risks for shared micromobility

In 2021, Voi presented its first Safety Report, explaining our efforts to build a safer service. To inform our report, we consulted with leading safety experts and identified the following key risks causing micromobility accidents:

1. Heavy, fast-moving vehicles present the most significant road safety risks.
2. Lack of safe road infrastructure poses a significant risk for all vulnerable road users.
3. New modes of transport present an increased risk of accidents during the first rides.
4. Lack of knowledge and compliance with traffic rules cause risky riding behaviour.
5. Riding under the influence of alcohol and drugs is a critical risk factor.
6. Pavement riding and poor parking create hazards for other road users.

Voi's 2021 Safety Report



Measuring progress towards Vision Zero through safety performance factors

VISION ZERO WAS BORN in Sweden, just like Voi. The core message of Vision Zero is that no loss of life is acceptable in traffic. For us at Voi, this also includes deaths related to air pollution and climate change.

We believe all accidents are preventable through a safe environment, safe vehicles and equipment, and safe behaviours. No matter if you are riding, working or living with micromobility.

Voi has identified the following safety performance factors impacting the risk of accidents associated with our service, and the ability to reach our Vision Zero targets. Our Safety Footprint is the key performance indicator we monitor and track to evaluate the progress towards our goal.

Factors impacting the risk of accidents, and thus the chances for Voi to reach our Vision Zero.

Factors where Voi's actions can have a broader positive contribution to Vision Zero in cities.

Vision Zero for Voi

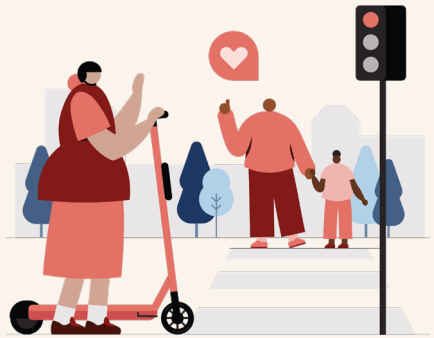
We believe that all accidents are preventable, and have a target of zero fatalities and severe injuries in our value chain by 2030.

Safety Footprint

We track progress to Vision Zero through our safety footprint, the accident rate, measured by accidents per million ridden kilometres.

Vision Zero in cities

The Stockholm Declaration (2020) called on businesses to contribute to the road safety-related Sustainable Development Goals.



Safe vehicles and equipment

- Fundamental vehicle design
- Brake quality and maintenance
- Utilising sensors to monitor vehicle health
- Maintenance routines
- Repair quality
- Battery management
- Health and Safety at work

Safe behaviours

- Safety education and training
- Incentives and punitive measures
- Protecting third parties and vulnerable groups
- Preventing intoxicated riding
- Encouraging helmet use

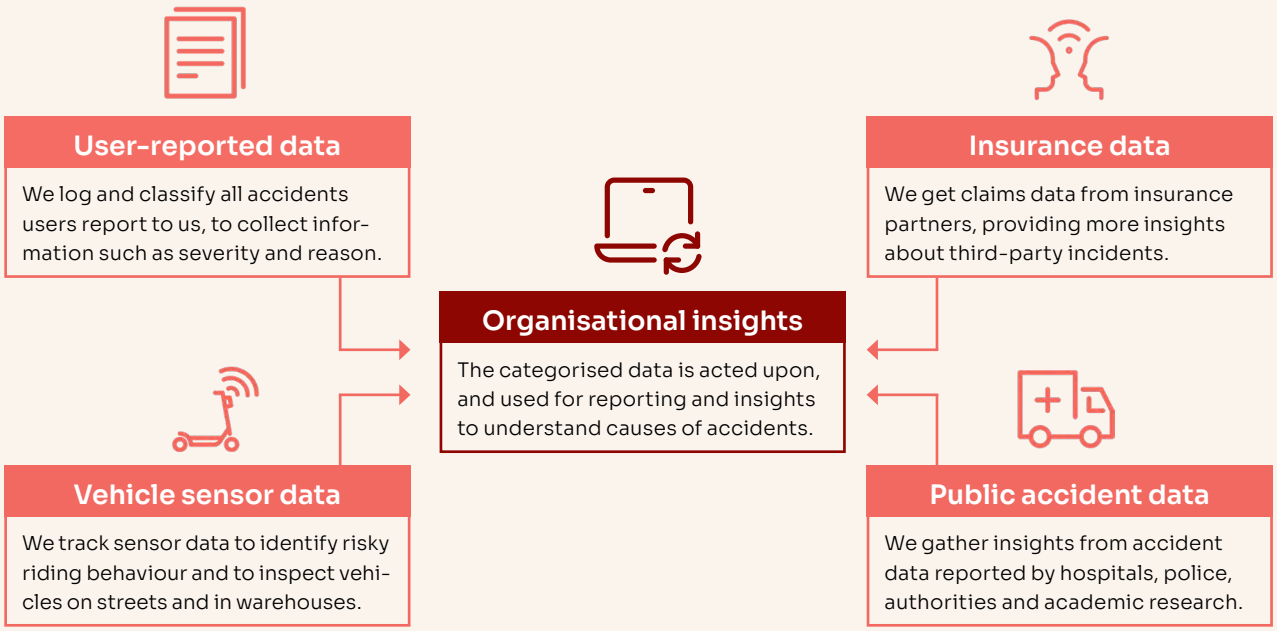
Safe environment

- Parking infrastructure to reduce clutter
- Enabling modal shift for safer cities
- Data sharing to identify risky locations
- Lobbying for bike lanes and car speed limits

Management of data for insights and reporting

■■ At Voi, we are obsessed with good data. When it comes to safety, we are continuously striving to collect precise accident data to make our service safer.

■■ To achieve this goal, our commitment to accurate accident data collection must be matched by the public sector's efforts to prioritise data collection. Together, these efforts will improve the safety of micromobility.



UNCERTAINTIES WITH ACCIDENT REPORTING remains a concern for shared micromobility. Today, there is no universal standard for the gathering and reporting of accident data, meaning the number of reports is subject to the ease and efficiency of the reporting process. Consequently, it is challenging to make comparisons between operators and claim that one is safer than the other.

At Voi, we believe that every accident is one too many. That is why, when an accident occurs, we consider it critical to gather as much data as possible to understand the true causes of accidents. This is how we build a safe service and reduce the risks of accidents. We take our commitment to safety seriously and choose to publicly disclose our accident data to hold ourselves accountable and monitor our progress towards achieving our Vision Zero target.

Diversifying data for decision-making

Our primary source of accident data is from user reports, reaching us through our support channels in the app, email and phone. When an accident is reported, our critical incident agents follow up with the affected rider and ask a set of questions to categorise the severity of the incident and identify other relevant factors that contributed to the accident.

All accidents are logged in a database, enabling us to perform proper risk assessments. We continuously track this data and share reports with a steering committee, which includes executives and key decision-makers. This process allows us to quickly escalate and act upon any issues as needed while also providing insights into our product and vehicle development.

In addition to user-reported data, we receive information about accidents through contacts with the police, insurance partners and media. We are exploring ways to use sensor data to identify and prevent accidents. Moreover, we perform vehicle tests and track external research to build intelligence on safety.

Different data sources offer diverse perspectives and insights into accident circumstances. By tracking multiple data sources, we can determine the true causes of accidents and take appropriate actions.

Keeping track of severe accidents is key

Although we believe all accidents are preventable, Voi places a special emphasis on preventing major and severe accidents, especially fatalities.

Data on accidents causing minor injuries is less comprehensive due to under-reporting. Nevertheless, we use it to gain insights into the continuous improvement of our safety work. The more severe the accident, the more robust the data is, as there are established standards for police reporting and medical records. This makes us more confident in the accuracy of the data, and thus we report on major and severe accidents.

By the end of 2020, we made significant improvements to our data collection and processing methods, and it is continuously improving. As a result, we now have two years of extensive accident data on over 120 million rides taken between January 2021 and December 2022. **Over this period, we have recorded a rate of 5.45 accidents causing major and severe injuries per million ridden kilometres**. We provide policymakers with accurate accident data to help them make informed decisions regarding accidents, and we continue to refine our data collection methods to improve this record further.

In March 2021, the Swedish Transport Agency released a report on micromobility in which they stated that it takes time for new vehicles to establish themselves on the road. Therefore, drawing firm conclusions about safety risks based on only a few years of data is difficult. Nonetheless, we remain committed to tracking and reporting accidents related to our service to increase awareness of the safety risks associated with shared micromobility, while sharing learnings with our partners.

Public accident data indicates decreasing risk of accidents

In recent years, there have been numerous reports highlighting an increase in e-scooter accidents, without recognising the increase in rides. While we support the importance of accident reporting, we believe that some of these reports have contributed to a false narrative around e-scooter safety. The reports often focus on absolute numbers of accidents without taking into account the significant increase in the number of e-scooter rides and distance travelled. Additionally, the rise in sales of private e-scooters used outside of shared micromobility operators' operational zones further skews these statistics.

Together with peers in our industry, we analysed how accident risk has developed in Sweden; one of the countries with the most accurate public sector collection of accident data. We combined industry-wide trip data and compared it with the public accident records. The research shows that the risk of accidents is decreasing, although there was an increase in the number of accidents as more people are travelling with shared and private micromobility.

Similar conclusions were found in research on accident risks, based on operator accident data, conducted by the European association Micromobility for Europe.

Call for public-private data exchange

As previously stated, today there is no universal standard for gathering and reporting accident data, which is also subject to the ease and efficiency of the accident reporting process. Underreporting of accidents remains a concern for shared micromobility, just as for bikes.

Our accident reporting system builds on user-reported accidents, which are prone to recall bias. It is also uncertain whether all users involved in an accident decide to submit a report, and we observe differences in reporting culture between countries.

To properly evaluate the safety of shared micromobility, it's necessary to also look into and improve public accident data collection from hospitals and the police. Ensuring that operators and public authorities consistently collect data following a mutual protocol can enable collaboration to improve safety. Therefore, we believe that public-private collaboration on accident data exchange is essential to improving the understanding of micromobility safety.

For instance, public accident records typically do not differentiate between shared and private micromobility vehicles, which for example is an issue since private vehicles do not have geofenced speed limits. Furthermore, research conducted by Micromobility for Europe indicates a higher fatality risk for private e-scooters than shared e-scooters.

Voi believes that more car-free mobility options are essential to reduce car dependency in cities. We are committed to collaborating with our stakeholders to improve the safety of shared micromobility.

Changing cities

Guiding riders and cities to safer streets

Voi is piloting an in-app navigation feature to solve two pain points for shared micromobility: bad parking and lack of safe road infrastructure. Gathering trip and accident data can also help inform how to make streets safer.

Hi Christy!

Christy Pearson is our Head of Central Policy, leading Voi's efforts to support in shaping good regulations. With her expertise, we are able to make data-driven decisions and create hyperlocal proposals for service design in cities, which are essential to improving safety.

How can the service design help improve safety?
Through our operations, we gather data that provides us with valuable safety insights. For example, we analyse information about street conditions and accident locations to determine where to place vehicles, what information to provide to users and how to set up zones to maximise safety.

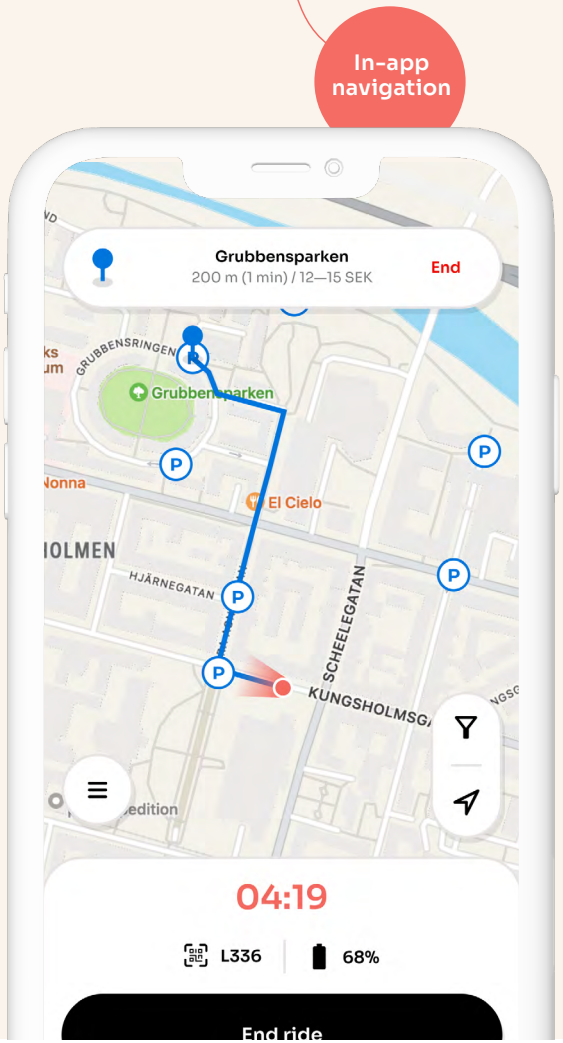
What are the most pressing challenges to improving safety with shared micromobility?
We see that the most severe accidents involving micromobility also involve some form of heavy vehicle. Therefore, a key challenge to solve is how to make roads safer for light vehicles such as bikes, e-bikes and e-scooters. This requires the creation of dedicated infrastructure, as well as interventions such as lower speed limits in inner-city areas where dedicated light vehicle infrastructure is not available.

Infrastructure has a huge impact on micromobility safety. Is it time for cities to roll up their sleeves?
We know that ensuring safe infrastructure for micro-mobility is crucial, and we see many cities are already working on this. However, in some instances, cities must go further and prioritise space for micromobility and pedestrians over space for cars.

This is essential to ensuring safety and supporting the decarbonisation of transport. In European cities, it is estimated that about 50% of public space is dedicated to roads, so there is huge potential to reallocate some of this space toward pedestrians and lighter vehicles.

Navigating riders through safer routes and to parking perfection

- ✔ Guiding riders from A to B
- ✔ Helping riders to find parking
- ✔ Finding safer & calmer routes
- ✔ Avoiding slow-speed zones
- ✔ Price estimate before ride



Voi is piloting in-app navigation, taking riders through safer routes and helping them find parking spots at the end of each ride.

NAVIGATING BUSY STREETS with heavy traffic can be hazardous for vulnerable road users. While many cities are investing in bike lanes, finding a safe route through urban streets on a micro-vehicle can still be challenging, especially for those who are not accustomed to it or know the city. This is one of the issues we aim to tackle with the new in-app navigation feature we are piloting. We combine this feature with a phone holder on every vehicle to ensure safe, hands free navigation.

Developed in partnership with Citymapper, this new feature helps riders plan their route from A to B by entering the destination address before starting their ride. The system then automatically recommends quieter routes with proper bike infrastructure, while avoiding busy junctions and dangerous manoeuvres, such as turning across traffic on busy roads. Furthermore, the navigation feature avoids areas labelled as non-riding or slow-speed zones, such as pedestrian streets. We believe this feature has the potential to provide a considerably safer user experience.

Since road infrastructure is a crucial factor contributing to accidents, the feature is currently in the piloting phase. However, as we continue to improve the capacity to add more data sources to the algorithm,

Research: E-scooters do not affect accidents in cities with many bike lanes

Academic research conducted by economists from Vienna and Frankfurt observes how the introduction of shared e-scooters has impacted the rate and severity of police-reported traffic accidents in European cities.

The findings suggest that the overall number of accidents has increased on average. However, a closer examination of the data reveals that the number of accidents has remained stable in cities with a high bike-lane density, while an increase is observed in cities with limited cycling infrastructure. The researchers conclude that policymakers can play a pivotal role in mitigating accidents related to e-scooters and changing urban mobility to make roads safer for vulnerable users.

"We personally view this as a policy and infrastructure failure, especially given that our six sample countries and other European countries are politically committed to developing national cycle strategy plans aimed at increasing the modal share of micromobility users", said one of the authors, Cannon Cloud.

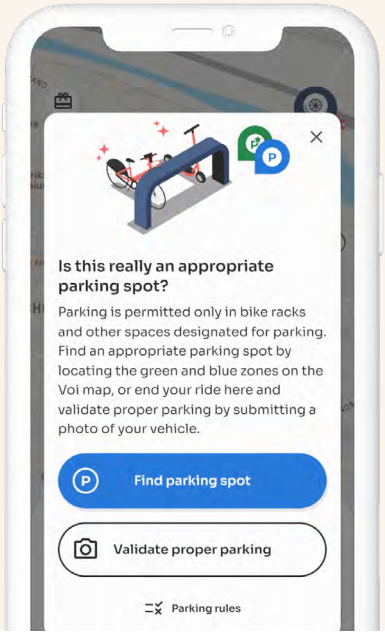
we envision the routing could also provide opportunities to re-route from accident-prone areas based on historical accident data. Furthermore, the feature offers the potential to avoid streets with temporary issues, such as gravel, potholes or wet leaves on rainy autumn days.

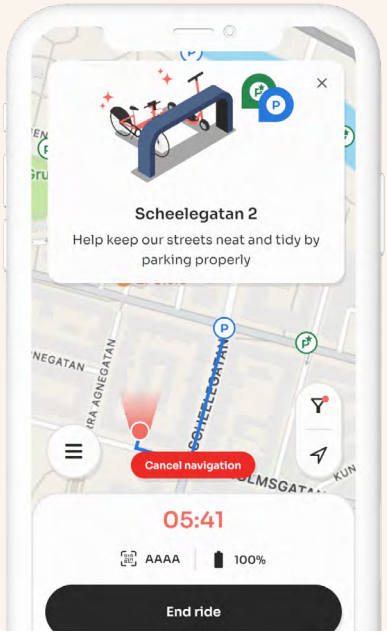
Guiding users to their parking destination

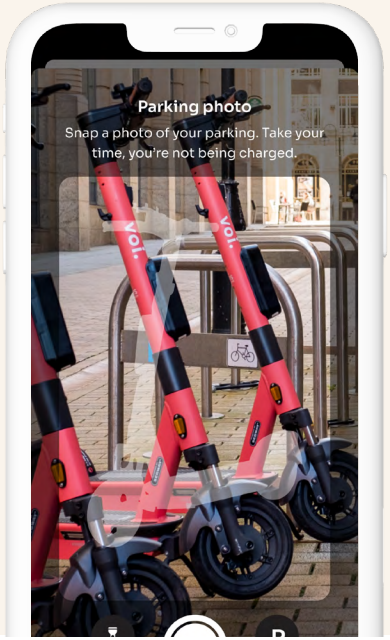
Guiding users to their destination often involves directing them to the nearest parking spot. Our feature also includes a “find parking” button that allows riders to find the closest parking spot during the ride, even if they do not require navigation for the entire trip. As more cities are dedicating space for micromobility parking, this feature reduces users' difficulty in finding these spots.

Keeping pavements free from clutter ensures safety for all road users, including vulnerable groups, such as the visually impaired. In addition to the parking navigation feature, Voi has implemented several measures to promote responsible use of our service and correct parking.

Improving parking behaviour starts with educating riders on how to park during the onboarding process, and we continue to iterate these messages in the app to ensure that users understand where and how to park. At the end of each ride, riders must snap a photo of the parked vehicle to verify it is parked correctly. Our user support team reviews the photos and provides instructions to riders who park incorrectly. Repeated offences may result in a warning and fine. However, our data shows that riders typically correct their parking behaviour when instructed on how to park correctly. V.







Redistributing space in urban areas is key to fixing parking

At Voi, we believe that cities and towns should prioritise micromobility over cars by allocating more space to bike lanes and parking spots. Redistributing space in this way will benefit all two-wheeler riders, whether they are on a bike or e-scooter.

The use of mandatory parking setups for shared micromobility is becoming increasingly common. Voi supports this development since it reduces clutter and minimises accident risks for vulnerable road users. However, it is elementary that parking spots are widely available, and we believe that mandatory parking is mainly relevant in high-density areas.

We recommend having a **minimum of 40 parking spots per square kilometre, with at least three spots per e-scooter** to ensure order and accessibility of the service. The recommendation is in line with a joint industry stance developed with our industry peers.

In less dense areas, particularly the outskirts, we suggest allowing more flexibility in parking, as long as the vehicle is parked responsibly and with clear rules communicated by operators. This approach improves access and allows for a data-driven approach to identify areas that need dedicated parking bays.

Hey cities, let's work together to get it right

Infrastructure plays a critical role in the safety of micromobility, just as it has impacted bike safety for decades. With structured data collection, Voi can support cities with insights to make streets safer.

LAST YEAR, VOI CONDUCTED a case study in Oslo to demonstrate the potential of accident data to identify hazardous areas for vulnerable road users. We analysed user-reported accident data that riders attributed to road-related issues. We combined this data with insights from public reports and sensor data from our vehicles. Furthermore, a survey sent to Voi users revealed that 64% of respondents had felt unsafe due to poor road conditions.

The data analysis enabled us to identify risky locations in Oslo and create a map. We then visited each site to determine appropriate safety measures. In some cases, such as when an icy road had caused an accident, the solution for us as an operator may be to pause operations or slow speeds in the specific area.

In other cases, such as when roads are uneven or in busy intersections, the solution is to address the source of the problem by enhancing safe road in-

Inspiration: Road-related risks and ideas for improvement

Urban areas can be full of potential hazards, and awareness of the most common ones can help increase safety. Here are a few ideas for reducing risks:

1. Potholes. The wear and tear of roads can lead to undesired surprises for everyone riding a bike or e-scooter. Cities should prioritise fixing potholes and other road bumps quickly to prevent accidents. Real-time sensor and accident data from Voi can help identify these spots, and warnings can be added to apps to alert users.

2. Gravel. Even small stones and wet leaves can create a slippery surface that poses a risk to road users. This is another example of how using real-time sensor data to identify areas with potential hazards can help reduce these risks.

3. Junctions. Crossroads and other intersections are particularly risky, particularly for riders not accustomed to navigating roads. This means that we need to educate riders on how to safely cross junctions. Additionally, cities may consider developing more innovative ways to guide road users, such as with street paint and signs.

frastructure for vulnerable road users. For example, lowering speed limits, widening bike lanes, filling potholes, or using street paint to guide riders safely through junctions. These improvements would enhance the safety of all road users, and Voi's data can help inform these decisions.

We shared the case study with Oslo municipality to promote collaboration on making streets safer. The study inspired researchers from the Norwegian Institute of Transport Economics and the Norwegian Public Roads Administration, who are now taking this initiative further. The researchers are examining how to utilise micromobility operators' data to identify risky spots in Oslo, and Voi is one of the partners providing data.

Identifying areas at risk of pavement riding

Riding on pavements is a safety concern for vulnerable road users, and it is important to prevent it through regulation, education and punitive measures. However, Voi user research shows that some people resort to riding on pavements due to feeling unsafe when riding side-by-side with cars on the roads.

As an operator, building and maintaining safe bike lanes is not within our control, but we are piloting a range of technologies in Oslo and other cities to identify locations where pavement riding is at risk, indicating where there is a need for better micro-mobility infrastructure. We believe this can be a valuable resource to support the public sector in identifying risky spots and prioritising investments in bike lanes. After all, this will not only benefit micromobility riders but also support the transition to sustainable cities with more people opting for micromobility.

It has been almost five years since Voi launched, and this is just a glimpse of what the future holds for different kinds of micromobility data to make smart decisions for creating safer streets in cities. V.

> We are very satisfied with the cooperation with Voi. For a research institution like the Norwegian Institute of Transport Economics, data sharing and openness from operators like Voi is very important for doing research on traffic and accidents.

Espen Johnsson, researcher at the Norwegian Instutite of Transport Economics

Voi user research shows that many e-scooter riders feel unsafe when riding due to other road users and a lack of safe infrastructure.

Darker hexagons are places where pavement riding is more common, indicating a need for better micro-mobility infrastructure or other measures such as road speed limits

Vehicles and operations

Ensuring that vehicles are safe at all times

Voi believes in the transformative power of technology to achieve Vision Zero. Vehicle and phone sensors allow us to constantly monitor the health of our fleet and develop cutting-edge solutions to identify and prevent accidents.

Hi Nida!

Nida Syed is leading her team of engineers in developing the tech infrastructure that enables us to connect and monitor thousands of vehicles in real-time. As our Engineering Manager, she is instrumental in exploring and developing new ways to identify and prevent accidents.

Internet of Things (IoT) is essential for shared micromobility. Why is this the case?
IoT is a key enabler, providing real-time data and insights into our vehicles and the rides taken on them. This not only helps us optimise operations but also enhances rider safety and enhances user experience. With the goal of a seamless user experience for our riders, IoT makes it possible for users to avail of our service directly through the mobile app, with real-time information about vehicle availability and location.

How can all those vehicle sensors be leveraged to improve micromobility safety?
The vehicle and IoT sensors can detect and report any issues with the vehicle in real-time, enabling us to take swift actions, allowing for predictive maintenance and reducing downtime. This allows rider safety and prevents potential accidents which could be caused by faulty vehicles.

Today we already use the sensors for essential safety features such as speed limit enforcement, geofencing and rider behaviour monitoring. With more advanced sensors, we will open up opportunities such as collision avoidance and blind spot detection.

The micromobility industry is still male-dominated, especially in engineering. What is your experience working in this field?
Gender imbalance is the hard truth we are living with today. Over the years, I have grown almost accustomed to this, which is not necessarily a good thing. In practice, this means fewer role models and mentors I could look up to, leading to self-doubt and imposter syndrome.

More than ever, it is necessary to encourage and empower women to pursue education and a career in engineering. The products we build cater to a wide range of users. Therefore we need to bring diversity to the teams building these products. Diverse teams bring a spectrum of perspectives, experiences and ideas to the table.

Our safest vehicles to date

We are excited to announce that last year, we expanded our fleet with two new vehicles: the Voiager 5 e-scooter and our Explorer 2 e-bike.

DEEP ANALYSIS OF REPAIR CYCLES and quality assurance checks of our previous models has enabled us to develop even more sturdy and durable vehicles. Voi conducted its own additional testing on the Voiager 5 and Explorer 2, going beyond standard practices to ensure the quality and reliability of vehicles prior to launch.

The Voiager 5 features a larger front wheel and increased tyre tread depth, which improves safety and greater shock absorption for smooth rides even on rough surfaces. Additionally, the height increase between the road and the rider prevents scraping of the foot deck, allowing for easier navigation of potholes and smoother travel on city roads.

The Explorer 2 has been designed with durability in mind, making it easier to maintain and keep safe in service for longer. Furthermore, we have updated the e-bike with two brake levers rather than one and added IoT features to prevent theft.

Millions of trips have been taken on our Voiager 5 and Explorer 2, contributing to our grand total of over 150 million rides.

FEATURES WE ARE EXTRA PROUD OF

1 In-house developed IoT

Voi's developed its Internet of Things (IoT) technology in-house, combining data from various sensors to determine the vehicle's precise position with sub-metre accuracy. This feature provides a seamless riding experience within geofenced zones and improves the accuracy of parking.

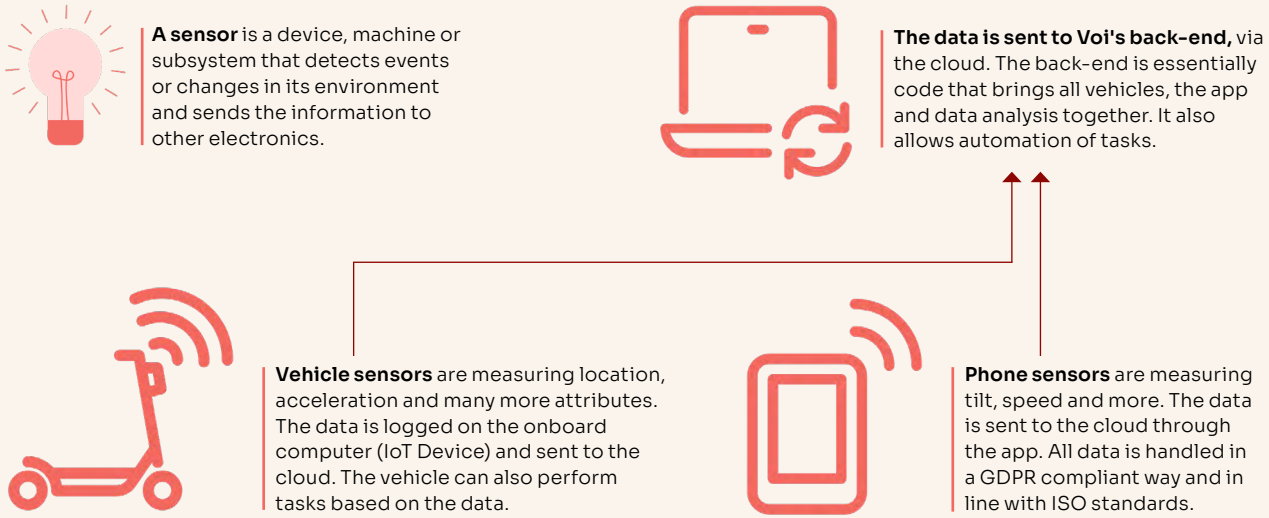
2 Inclusive handlebar design

When designing the Voiager 5, we collaborated with a diverse range of stakeholders to understand their unique requirements. Our handlebar design caters to users, particularly women who typically have smaller hands, ensuring that everyone has a comfortable and enjoyable riding experience.

3 Brakes with greater power

The Voiager 5 comes equipped with intuitive and user-friendly brakes, making it easy for riders to control their speed from the first ride. Our new front and rear brakes have a larger diameter and width, providing greater braking power than previous models.

Sensors and Data: The future of accident prevention in our industry



The next big technical leap in our industry is all about sensors and data. As a company committed to the safety of our riders and the general public, we recognise the crucial role of technology in preventing accidents.

OUR E-SCOOTERS AND E-BIKES are equipped with a wide range of sensors providing valuable insights into the health of the vehicle hardware and its different components. These sensors monitor a long list of events on the vehicle, such as the number of wheel spins, acceleration and position of brake levers, to name a few.

When a problem arises, the sensors can send a signal to the vehicle's onboard computer (the IoT device), programmed to respond in various ways. For example, the IoT device may notify the backend system – the code that brings all vehicles, the app and data analysis together – enabling us to analyse the problem further. When required, the IoT can also shut down the vehicle and create a ticket for our teams to perform a repair task.

While we have primarily used these sensors to manage the hardware and ensure the safety and charge of vehicles for rent, we have learnt that they hold tremendous untapped potential for future development.

Leveraging sensor data to improve safety

At Voi, we develop our IoT technology in-house at our locations in Gothenburg and Stockholm. This approach gives us greater flexibility in producing, collecting, analysing and utilising data from the onboard sensors. Today, we log data across our entire fleet, capturing more than 20 unique vehicle attributes, from turn indicators to wheel spins. The data feeds into algorithms looking for unusual events. The vehicle sensor data is coupled with other types of data from the app, external sources and, in some cases, even onboard cameras to build more context when identifying safety risks and solutions.

Just as hardware components exhibit error characteristics, a customer's ride also has signature attributes that we use to identify unusual or unsafe events. By analysing GPS movement, throttle and brake usage, and accelerometer data, we can detect both standard and not-so-standard events. For example, we can spot very harsh brake action or other sudden manoeuvres that could indicate an accident risk.

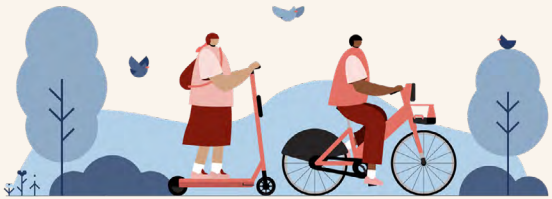
These characteristics offer unique insights into

> We want to protect all road users. Building on our existing insights, working with Voi made it easy not only to better understand e-scooter rider behavior and critical situations, but also to plan for more adapted instrumentation in our next studies.

Cecilia Sunnevång, Vice President Research, Autoliv

> E-Safer will provide unprecedented data on e-scooterists' behaviour. We will understand why crashes happen and will get a step closer to preventing them.

Marco Dozza, Professor in active safety and road-user behaviour, Chalmers University of Technology



user experiences and potentially risky behaviours that could result in an accident. These insights inform our development of new vehicles, in-app features and operational procedures to improve the safety of our service. For instance, we can use this data to identify vehicle misuse, enhance the accuracy of accident reporting and implement preventative maintenance of the vehicles.

Partnerships to push boundaries

We collaborate extensively with partners to build intelligence around accident risks, enabling the development of cutting-edge safety features. One partnership that we are particularly proud of is the government-funded pre-study (E-Safe) conducted with Autoliv, a Swedish traffic safety company. Through vehicle sensors and on-board cameras in Gothenburg, we collected naturalistic data to analyse how users ride e-scooters and their risky riding behaviours.

The pre-study represents one of the first published e-scooter research studies based on naturalistic data. The results from this pre-study show that our data collection capability is outstanding in detecting not just accidents, but also infrastructure issues and general behavioural data. One of the most intriguing findings was the ability to estimate a "comfort boundary" that e-scooter riders keep in relation to pedestrians. The data showed that riders typically do not let pedestrians come closer than 3.5 metres in front and 2.5 metres on the sides, as a buffer space to reduce the risk of collisions.

Naturalistic data is is collected from sensors as road users attend to their daily routine. By capturing the genuine road-user behavior, naturalistic data may show why crashes occur.

Following the Autoliv pre-study, we plan to expand the collaboration with more partners, including the Swedish Transport Administration, in a recently started 2-year study (E-Safer) led by Chalmers University of Technology. The research will focus on interactions between e-scooter riders and other road users to identify reasons for accidents and ways to prevent them.

What does the future hold?

Voi has dedicated teams of machine learning engineers and data scientists who use all available data to constantly improve our understanding of how to improve the safety of our service. By coupling the sensor data from our vehicles with phone sensors and a wealth of other data, we can implement solutions to prevent risky riding behaviours such, as pavement and tandem riding.

Over time, we anticipate access to even more sensors, data, and insights from our fleet. One thing is for certain: we will continue to use this data for vehicle innovation and product development. Furthermore, we will continue developing strong partnerships to identify solutions that make streets safer with shared micromobility.

Mastering repair and reparking routines

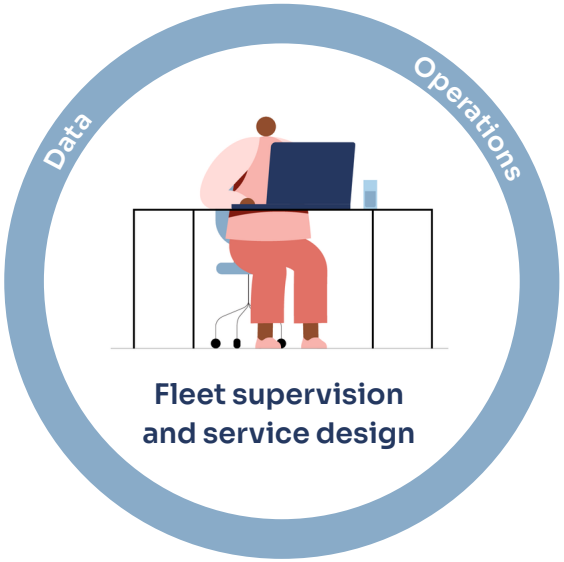
Operation of our rental vehicles is at the core of our business, and data is an essential element for improving efficiency and safety. Tracking data allows us to quickly identify vehicles in need of extra care.

Data-driven service design

Our fleet management teams work centrally to analyse how many vehicles should be placed in specific areas, when they need to be rebalanced, and how to identify lost vehicles. We comply with all requirements and share real-time fleet data.

Identifying maintenance and repair needs

We use in-built sensors and user reports to identify vehicles requiring repairs. Additionally, we implement proactive inspections and maintenance routines.



Deployment of vehicles

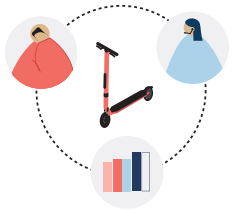
When placing, rebalancing and collecting vehicles on the streets, we use a variety of cargo bikes and vans. Our ultimate goal is to achieve 100 % electrified operations in all cities.

Battery swaps, rebalancing and inspections

Our on-street teams travel on cargo bikes or in vans to swap to fully charged batteries and rebalance vehicles as necessary, to ensure their optimal utilisation. During these routine visits on the streets, our fleet staff performs in-field quality checks to verify that the vehicles are safe.

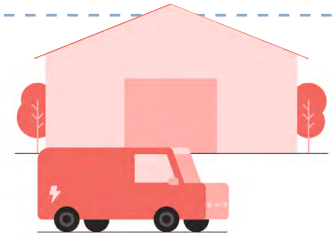
Moving wrongly parked vehicles

Our operations systems leverage GPS data, as well as in-app end-ride parking photos and reports from authorities to identify incorrectly parked e-scooters and e-bikes. As soon as a wrongly parked vehicle is identified, we send a task to our on-street teams.



Maintenance and repairs in our warehouses

When vehicles require maintenance and repairs, we transport them to our warehouses, where our skilled mechanics guarantee their safety while extending their lifespan through maintenance. Our mechanics adhere to strict protocols to ensure that vehicles meet quality standards before returning them to the streets.



Rider behaviour

Education and nudges to shape new norms

Improvement of public education on traffic rules is crucial for the shift to micromobility and sustainable cities. As more young people delay or skip obtaining a driver's license, education is necessary to promote safer and more sustainable transportation choices.

Hi Carro!

Caroline Hjelm has been a key contributor to the growth of Voi's brand across Europe since day one, and currently serves as our Head of Marketing. She plays a vital role in ensuring that safety is a central focus of our marketing strategy.

Why is Voi putting so much focus on safety in marketing activities?
As we introduce e-scooters and e-bikes to cities across Europe, we humbly acknowledge that there are challenges we must address for rider safety. From a marketing perspective, we decided that the best thing we can do is to educate our users about the rules of the road and share safety tips, so that they become better and safer riders. Through education and clear communication, we are taking a proactive approach to safety for our users, making public spaces safer – for everyone.

What are the challenges in reaching the users with information about safety?
It is about creating effective messaging that resonates with our audience, and we have taken the approach that safe riding and education do not need to be boring. Our latest safety campaign – Let's Get It Right – highlights five critical aspects of safe riding in a fun and engaging way. Through this campaign, we reached 83 million impressions online, educated over 30,000 people through our traffic school and won the Swedish design award for best video production.

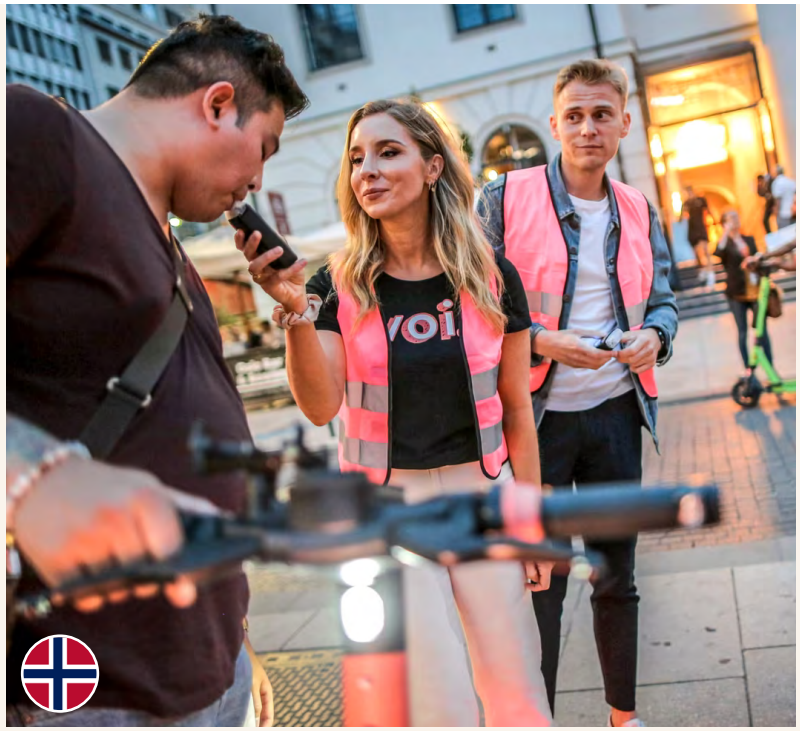
Surveys shows that women typically are more hesitant to try e-scooters due to safety concerns. Why do you think this is the case?
Research conducted in collaboration with Women in Transport shows that over three-quarters of women felt unsafe due to a lack of appropriate infrastructure, which was a barrier to e-scooter use. To address this, we work hard to initiate, strengthen and improve collaboration with city officials, governments, local communities and public transportation operators to galvanise change for the better.

Taking our message to the streets: Let's Get It Right

Last year, we campaigned for safety education across all towns and cities Voi operated, promoted through a diverse set of owned, earned and paid channels – and on the streets in Europe.

SAFETY HAS ALWAYS been a crucial part of Voi's marketing strategy, but last year we took it one step further with an international campaign focusing on safety education. Education on traffic rules is essential to prevent accidents and foster a safety-first culture on the roads. With a significant share of our users being young and potentially more inexperienced in traffic, it is vital that we ensure all riders are familiar with the rules of the road. The campaign's purpose was to raise awareness of five key safety issues: intoxicated riding, pavement riding, twin riding (riding with two people on a single vehicle), improper parking and non-compliance with traffic lights.

Collaborating with the public sector to educate about safe micromobility contributes to the transition



to greener urban transportation. According to a Voi survey of people who have yet to try e-scooters, safety concerns are the primary barrier to adoption. Providing a safe and secluded area for riders to try out our service and offering in-person safety instruction could go a long way toward getting more people to embrace this new form of urban mobility.

Offering digital and physical traffic schools

The Let's Get It Right campaign is more than just about communicating core messages; it is about engaging people through our digital and physical traffic schools. Before starting their rides, riders receive pop-up safety messages, followed by notifications and emails encouraging them to complete Voi's digital traffic school, RideLikeVoila.

We have had over 1.6 million unique Voi users engage with these messages, showing that safety is engaging when you craft the right message. Thanks to the campaign, we have recorded a significant increase in users completing RideLikeVoila.

To further educate riders and new users, we also offer safety practice events on the streets across Europe. In 2022, we hosted safety events across all markets, meeting with local communities to teach them about safe riding. At these events, people are invited to try out riding an e-scooter or e-bike in a secluded area, receive instructions on how to ride safely in traffic and get a free helmet.

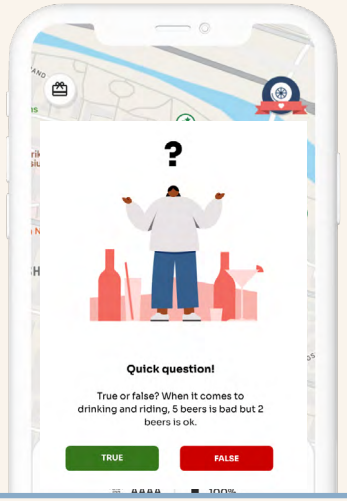
The Let's Get It Right campaign is an invitation to join our quest and become part of the solution. We will continue spreading these messages because safety is, and always be, a core value of Voi's marketing and communications. V.

2022 safety campaign

Goals: Breaking through the noise to teach existing and new riders the rules of the road, and to increase the share of users who take classes in Voi's free-of-charge online traffic school RideLikeVoila.

Channels: Paid digital, social media, emails and in-app messages, Voi's blog, on-vehicle marketing, media relations, and on-street safety events.

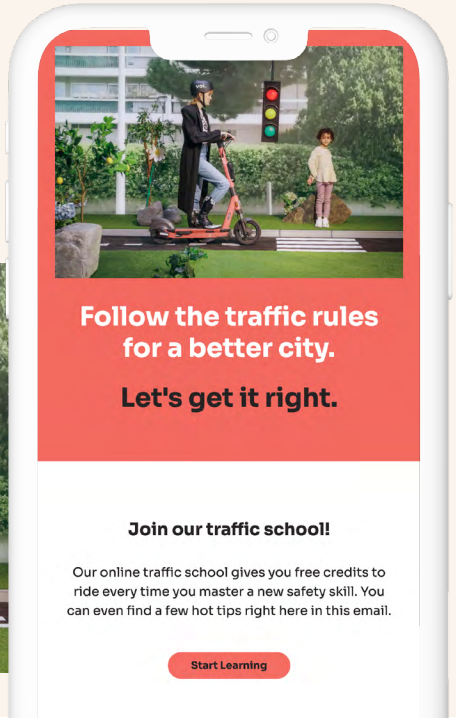
Learn more on our campaign website and video.



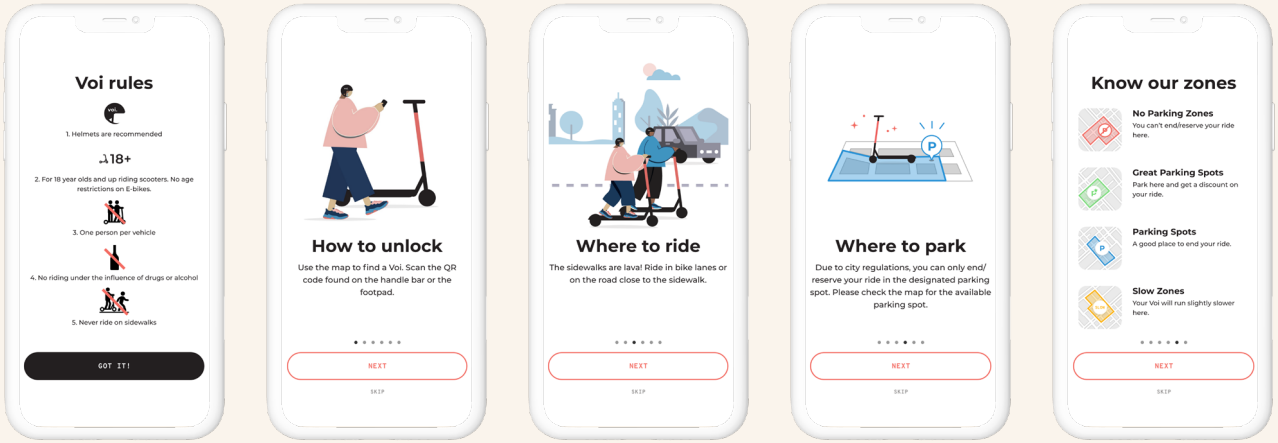
Our senior policy manager Tina Ghasemi Liljekvist interviewed by Swedish newspaper Dagens industri during one of our safety events. We actively engage with the media to set traffic education on the agenda.

5 rules for a better city

- ✔ Ride sober
- ✔ Ride roads not pavements
- ✔ One rider per vehicle
- ✔ Respect the traffic ligts
- ✔ Park with care



Developing responsible rider behaviour through our app



Education on safe riding is part of the core experience in our rider app. Our app includes features that prompt and remind riders to follow the rules of the road, and those who do not follow the rules are warned and nudged to change their behaviour.

USERS ARE AT THE HEART of our development process. We frequently test our hardware and app features and functionalities with users across different markets to ensure that we build a product that accommodates their needs and addresses their concerns. Through these tests, we identify where users may need more information or extra attention. As a result, we have improved our safety communications in-app to ensure we address our users' main concerns and highlight key areas of non-compliance.

Safety nudges through in-app features

In addition to education, Voi encourages compliant behaviour through the contextual design of the in-app user experience. By implementing in-app features

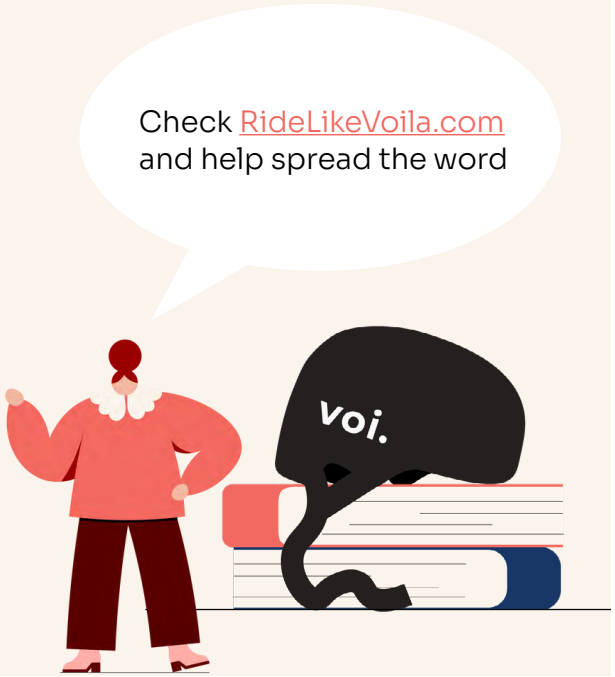
Safety onboarding for all riders

When starting the app, users are presented with essential safety information, including guidelines on wearing helmets and advisory against tandem riding, riding under the influence, and pavement riding. Voi continues to test different messaging and information across markets to ensure we provide the best support to our users. In addition, we offer a Safety Quiz and FAQ pages to address users' concerns effectively.

After onboarding, riders can choose to begin riding in **beginner mode**, which limits the top speed to 15 km/h.

Online traffic school for everyone

When engaging with users, we have found they have more specific questions about micromobility riding rules and regulations. To address this, we offer free access to our online traffic school to all users since September 2019. Today, we are proud to say that over 500,000 people have passed the test. Voila!



and customised messages in the app we address key concerns raised by cities, citizens and other members of our community to ensure we ensure safer and more considerate riding.

As shared micromobility is a relatively new service, we implement features in the app to nudge, remind and inform users of compliant behaviour. Voi has identified several priority areas, including riding while under the influence of alcohol, on pavements or with more than one person on a vehicle. These are all factors which significantly increase the risk of accidents, and where smart in-app features prompt warnings when identified by our algorithms to prevent these behaviours.

Safety reminders in user comms

In addition to core safety communications, we provide additional in-app messages during local events throughout the year. These include messages to inform users that drinking and riding is not allowed.

As a company born in the Northern hemisphere, we understand the impact of weather events on the safety of our riders. To minimise the risks of accidents during unfavourable weather conditions, we send in-app warnings to our riders. For example, we alert riders during winter when snow and icy conditions prevail, and also during extreme weather incidents, such as the Storm Eunice in February 2022, when we sent warning messages to riders in the UK.

Providing timely information about riding risks is crucial to ensure our riders' safety, and we urge our users to ride with caution during hazardous weather conditions or opt for alternative modes of transport if necessary.

Reaction test to prevent drunk riding

We have developed a cognitive reaction test that assesses users' state of sobriety before riding. If a user fails the test, they are advised not to ride and to opt for a taxi instead. Each year, more and more users choose not to ride after failing the test, indicating the success of this approach.

Identifying and preventing twin riding

In 2022, Voi launched an experimental twin riding identification and intervention feature. This feature uses proprietary technology to predict if rides are taken carrying more than one person. Upon identifying a twin ride, Voi sends a warning to the user and follows up with targeted education.

Alerts to stop pavement riding

Ensuring we share transportation avenues effectively is essential for building a healthy and safe city. Voi is piloting a range of technologies to understand where users are most likely to ride on pavements. By gathering this data, we can implement targeted educational messages to prevent pavement riding.

Helmet selfie to foster new norms

Voi launched its helmet selfie feature in 2020, incentivising users to wear a helmet when riding our e-scooters and e-bikes by offering ride discounts when doing so. The helmet selfie uses instantaneous image-classifier technology to detect if a rider is wearing a helmet.

Health and safety

A safe place to work and build our future

Voi's vision for the safety of both our users and staff adopt a Vision Zero approach whereby we believe that all accidents are preventable. We work hard to build supportive and diverse teams, promoting a culture of safety that permeates throughout the entire company.

Hi Anna!

As Voi's Head of Health and Safety, Anna Östensson brings over 15 years of experience in the field to ensure that our employees are safe at all times.

What are the main Health & Safety (H&S) challenges in shared micromobility?
The main Health and Safety challenge is that we are operating in a new industry with limited benchmarked practices. We always have to look around corners to find the best safety solutions and adapt them to our world of shared micromobility.

We also have intricate synergies between the safety of our employees, our users and members of the public. Initiatives to keep our riders safe positively impact staff safety; for example, when we ensure our e-scooters and e-bikes are thoroughly quality tested we reduce the time our employees have to spend on the roads picking up vehicles for repairs. We must constantly keep all three safety aspects in mind in all decision-making to truly live by our Vision Zero.

You talk a lot about the importance of having a safety culture. What does this mean?
The term "safety culture" can sometimes make us believe that it can be separate from the organisational culture, but I strongly believe that safety must be an intrinsic part of what we are and do. In companies with poor safety performance, you often see that it is a topic in its own silo that can easily be deprioritised when production takes precedence over safety.

At Voi, we ensure safety is part of everything we all do; it should never be a choice employees have to make. Rather, it is deeply embedded in procedures, decision making and, of course, our culture. Our culture is led by passionate and motivated employees and leaders, demonstrated in our missions and vision statements.

It is quite bold to believe that all accidents are preventable. Is this really the case?
Research shows that over 99% of workplace injuries are preventable. The reality is that safety is not passive, but something you have to actively work on. Anyone who believes that working safely is a matter of fate is a hazard to themselves and their co-workers. I truly believe we can prevent all injuries by being proactive, identifying hazards that might lead to injuries, and taking the necessary steps to mitigate and control them.

Building a safety culture across the entire company

Health & Safety is an integral part of Voi's culture and values. We follow a systematic approach to safety risk management and continuously strive for improvement to ensure we maintain high safety standards.

AT THE END OF 2018, Voi made a conscious decision not to operate with gig workers because shared micromobility is an operational-heavy business requiring workers to handle batteries and vehicles, among other safety-related risks. Therefore, Voi believes it is crucial to employ staff who are trained to execute procedures safely and guided by our Health & Safety supervision.

Voi firmly believes that all accidents can be prevented. We acknowledge that operational tasks involve certain risks, and we work diligently to integrate Health & Safety practices into every aspect of our work. Therefore, safety is essential to our culture and values.

Ultimately, a positive culture is driven by management. We frequently use the analogy that the standard you tolerate is the standard you accept. Managers must take ownership of safety and make it a top priority. This involves discussing safety as the first item on the daily agenda, checking in with staff,

The Voi values are at the core of our safety culture

We build with empathy
Be mindful of how the decisions you make impact safety, not only yours but also for colleagues, riders and other citizens.

We push boundaries
We operate in a new industry where we always need to look around the corner for the best safety solutions and raise the bar on safety every day.

We ride together
Keep each other safe: feedback is an integral part of our ways of working. We listen, ask and challenge if we see something unsafe.

walking the floor, and leading by example. These are all crucial activities and skills that managers need to drive positive change.

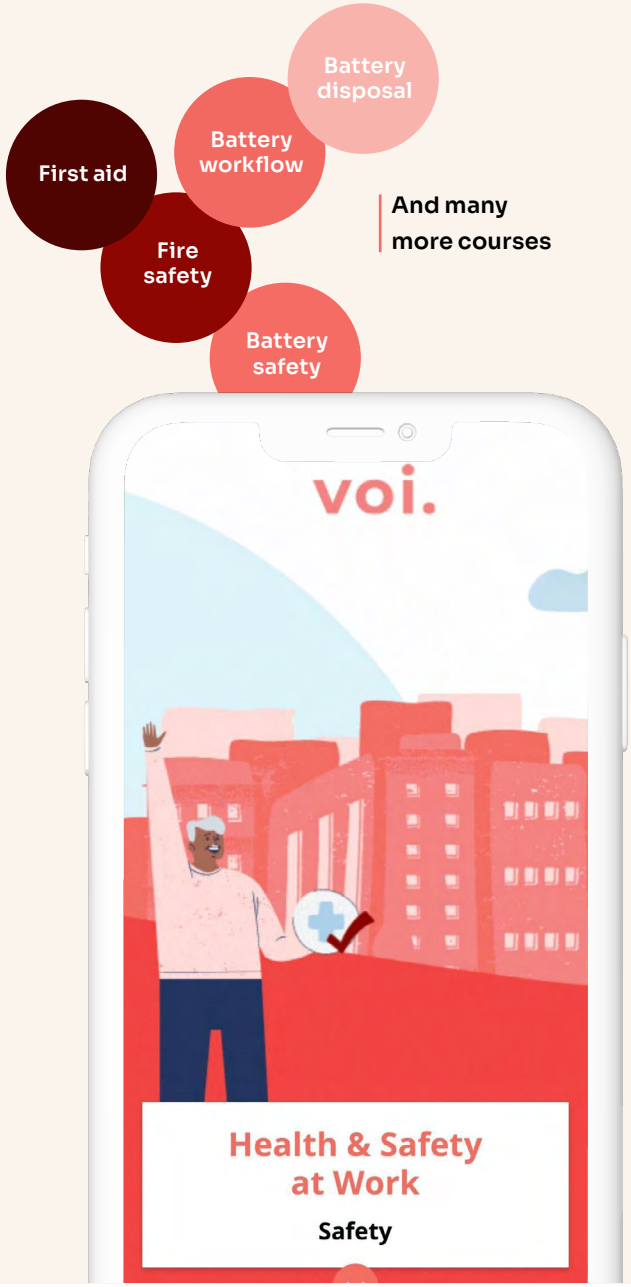
A systematic approach to safety risks

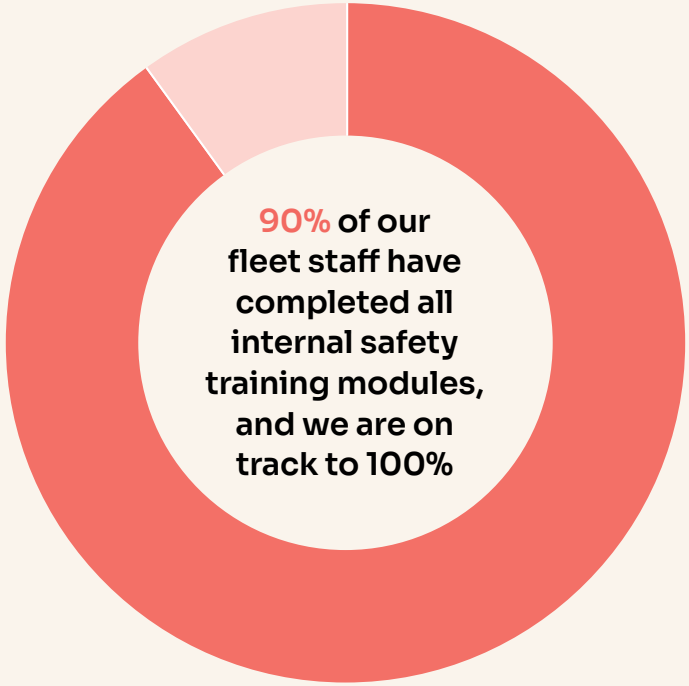
To ensure that safety is appropriately embedded in all of our operational processes, we have implemented a proven Health and Safety Management System (HSMS). Our HSMS follows a systematic approach to safety risk management and continuous improvement, aligned with the global best practices for safety management as set forth in ISO 45001. We are also actively pursuing ISO 45001 certification for our global HSMS.

Our HSMS ensures that every task performed by our employees in warehouses and on the streets is risk-assessed and control measures are identified and implemented. We update our risk assessments yearly and after any significant change or incident, and we regularly share best practices and lessons learned throughout the company.

In addition to our global risk assessment, each warehouse performs a yearly self-assessment review to ensure that all measures communicated through standard operating procedures and safety policies are implemented locally. We establish yearly safety action and improvement plans and communicate them to all warehouse employees, reviewed during safety audits.

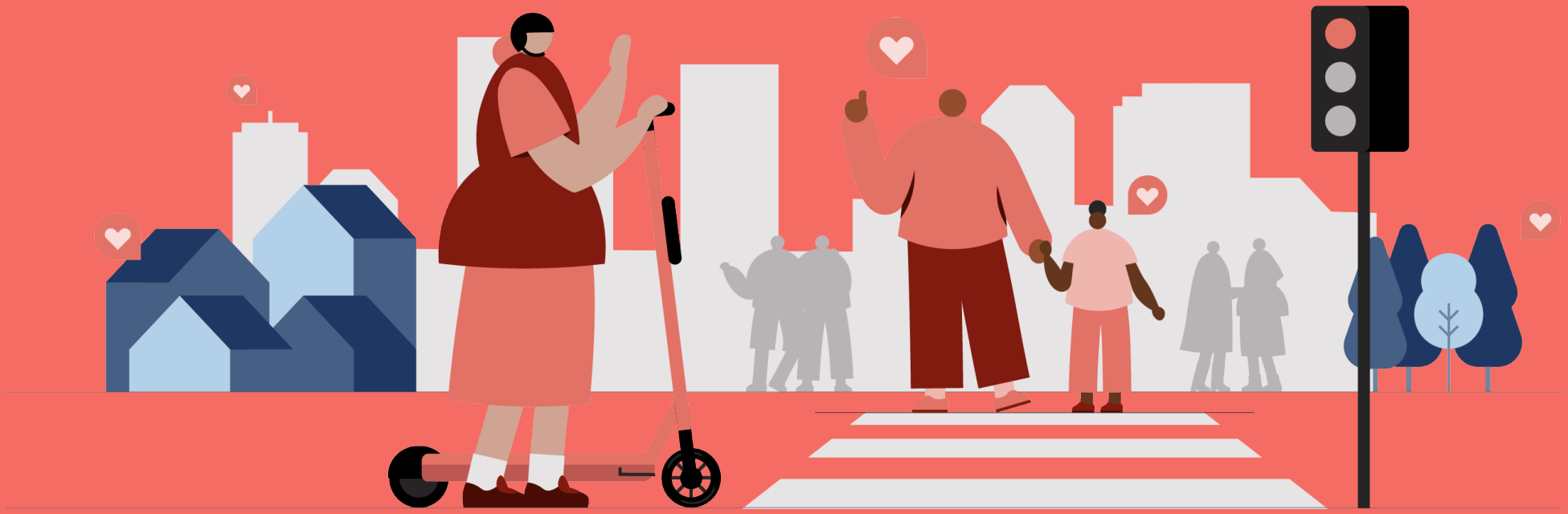
All safety incidents and observations are reported to the central H&S function for investigation, and corrective actions are implemented company-wide. Voi has a zero-incident mindset and believes that all safety incidents are preventable. V.





Safety training for Voiagers

- All Voi employees are trained in Health & Safety awareness, and we regularly push out new training modules through our Learning Management System (LMS) available to all our employees on their phones.
- Every new standard operating procedure around safety is launched with its specific training, and performance is tracked centrally.
- All new employees working at our warehouses receive H&S training on their very first day at Voi.



voi. Cities made for living

Learn more about Voi's sustainability work in our Environmental Report and Vision Statement