Energimyndigheten

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Energimyndighetens titel på projektet – svenska eSPARK - Utvärdering av elsparkcyklars roll i det fossilfria transportsystemet	
Energimyndighetens titel på projektet – engelska eSPARK - Evaluation of the role of e-scooters in the fossil free transport system	
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Nyckelord: 5-7 st Elsparkcyklar, användarmönster, livscyckel analys, styrmedel, enkäter, stadsplanering	

Förord

Projektet är helt finansierat av Energimyndigheten. Förutom forskare från Chalmers och RISE har två konsulter medverkat från Tångudden AB och Nimling AB. Som referensgrupp har bestått av: Transportstyrelsen: Pernilla Bremer, Göteborgs stad: Shahriar Gorjifar, Stockholms stad: Helene Carlsson och Johan Sundman, Mölndal: Olivia Hammerlid, Malmö: Olof Raber, Tier: Dan Nerén, Voi: Tina Ghasemi Liljekvist. VOI och Tier har bidragit med data för LCA analysen.

Innehållsförteckning

Nedan ligger en kod för innehållsförteckning. Förutsatt att du använder formatmallarna för rubriker så kommer rubrikerna automatiskt med i innehållsförteckningen när du klickar på förteckningen och trycker på F9.

Sammanfattning

I augusti 2018 introducerades elsparkcyklar i Sverige och sedan dess återfinns dessa i flera olika städer. Reaktionerna på denna expansion har dock varit blandade, främst på grund av den osäkra påverkan på transportsystemet. För att ta reda på vilken roll elsparkcyklar spelar för att uppnå ett effektivt transportsamhälle har eSpark genomfört forskning från tre olika perspektiv: 1) analys av användningen av elsparkcyklar genom rörelsedata, enkäter och intervjuer med användare och icke-användare; 2) livscykelanalyser för att utvärdera energiförbrukning och koldioxidutsläpp baserat på svenska användningsmönster; och 3) studera policyinstrument och goda exempel i städer.

Våra resultat tyder på att fördelarna ur koldioxidsynpunkt med elsparkcyklar är tveksamma baserat på nuvarande användningsmönster, trots företagens kontinuerliga ansträngningar för att förbättra fordonens säkerhet, hållbarhet och minska koldioxidavtrycket. Framför allt bidrar produktionsfasen avsevärt till miljöpåverkan, med aluminiumproduktion och batteriproduktion som ger de största bidragen.

Elsparkcyklar används främst av mobila personer i områden med hög aktivitetsnivå. Den typiska användaren är en medelålders man med barn mellan 7 och 12 år, som har körkort och ett höginkomstjobb. Dessa användare förlitar sig ofta på bil och/eller kollektivtrafik, och att vara en elsparkcykelanvändare ökar sannolikheten för att ersätta resor under 4 km till elsparkcykel med 46%. Vår forskning visar att faktorer som kännetecknar stadsdelar där elsparkcyklar ofta används är förekomsten av cykeldelningsstationer, taxistationer, nattklubbar (som barer och restauranger), tunnelbanestationer och övernattningsmöjligheter (som hotell och vandrarhem).

Även om elsparkcyklar potentiellt kan minska trängseln i hårt trafikerade centrala områden, både för bilar och kollektivtrafik, kan de också bidra till ökad trafik på cykelbanor. I takt med att antalet användare av elsparkcyklar ökar och olycksmönstren förändras på grund av sparkcyklarnas design, blir policy för ersättning och försäkring allt viktigare. Städer måste förstå hur regleringar påverkar användningen av elsparkcyklar och deras livslängd. Det är viktigt att reglera användning och parkering av elsparkcyklar, men dessa regler bör utformas noggrant för att undvika att minska användningsgraden eller förkorta elsparkcyklarnas livslängd. Därför bör städerna noga övervaka hur nya regler påverkar användningen av elsparkcyklar, livslängden och i slutändan miljöpåverkan från dessa fordon.

Vi anser att städer och operatörer bör föra en aktiv dialog för att fastställa den optimala integrationen av elsparkcyklar i det lokala transportsystemet. Denna integration bör syfta till att förbättra transporteffektiviteten och samtidigt säkerställa allmän säkerhet och ordning i staden.

Summary

In August 2018, e-scooters were introduced in Sweden and have since expanded to various cities. However, the reaction to this expansion has been mixed, primarily due to the uncertain impact on the transportation system. To address the role of e-scooters in achieving an efficient transportation system, eSpark has performed research from three perspectives: 1) analyzing e-scooter usage through movement data, surveys, and interviews with users and non-users; 2) conducting a life cycle assessment to evaluate energy consumption and carbon emissions based on Swedish usage patterns; and 3) studying policy instruments and best practices in cities.

Our findings suggest that the carbon benefits of e-scooters are questionable based on current usage patterns, despite continuous efforts by companies to improve vehicle safety, durability, and reduce carbon footprint. Notably, the production phase contributes significantly to the environmental impact, with aluminum production and battery production being the major contributors.

E-scooters are predominantly used by mobile individuals in areas with high activity levels. The typical frequent e-scooter user is a middle-aged man with children between the ages of 7 and 12, possessing a driving license and holding a high-income job. These users often rely on cars and/or public transport, and being an e-scooter user increases the likelihood of shifting trips under 4 km to e-scooter usage by 46%. Our research indicates that influential factors for neighborhoods where e-scooters are often used include the presence of bike-sharing stations, taxi stations, nightlife venues (such as bars and restaurants), subway stations, and overnight accommodations (such as hotels and hostels).

While e-scooters can potentially alleviate congestion in heavily trafficked central areas, both for cars and public transport, they may also contribute to increased traffic on bike lanes. As the number of e-scooter users grows and accident patterns change due to scooter design, policy considerations regarding compensation and insurance become increasingly important. Cities must understand how regulations impact e-scooter usage and their lifespan. It is crucial to regulate e-scooter use and parking, but these regulations should be designed carefully to avoid reducing utilization rates or shortening the lifespan of e-scooters. Therefore, cities should closely monitor how new regulations affect e-scooter usage, lifespan, and ultimately the environmental footprint of these vehicles.

We believe that cities and operators should engage in an active dialogue to determine the optimal integration of e-scooters into the local transportation system. This integration should aim to enhance transport efficiency while ensuring public safety and order issues in the city.

Inledning/Bakgrund

Shared e-scooters were introduced in Sweden in August 2018 and expanded nationwide by September 2019 with the involvement of ten operators (DN 2020). E-scooters, classified as bikes, adhere to the same regulations as conventional bikes in Sweden, including helmet requirements for riders under 15 and a maximum speed limit of 20 km/h. However, due to the unique riding characteristics of e-scooters, dedicated studies are necessary to evaluate their specific trip characteristics and their role in a transport-efficient society.

Previous research has focused on various aspects of e-scooters, such as modal substitution, usage experience, and environmental impacts (Kazemzadeh and Sprei 2022, Sexton, Harmon et al. 2023) but rarely looked at these together and with a specific focus on the Swedish context. To address this knowledge gap, eSpark has aimed to comprehensively examine e-scooter usage from three different perspectives. The first perspective involves collecting and analyzing movement data from 18 cities in Europe and North America, along with conducting surveys and interviews with users and non-users to understand usage patterns. The second perspective focuses on analyzing energy consumption, carbon emissions, and conducting a life cycle assessment (LCA) based on the collected data on e-scooter usage in Sweden. The third perspective involves studying policy instruments through literature reviews, and interviews with operators and city representatives, aiming to understand the current situation and identify good examples for e-scooters to contribute to a more transport-efficient society.

Regarding the analysis of movement data for e-scooters, prior works have studied the spatial distribution of e-scooters (see, e.g., Jiao & Bai, 2020; Bai & Jiao, 2020) but did not account for spatial dependencies. In the context of electric bike-sharing, Caspi et al. (2020) use spatial regression to account for spatial dependencies when estimating the distribution of e-bike sharing demand.

Other studies have looked into usage experience and modal substitution of e-scooters in other countries. Laa and Leth (2020) conducted a study in Austria and claimed that e-scooters mainly substitute walking and public transport, and e-scooter owners demonstrate the shift from personal cars. Kopplin, Brand et al. (2021) conducted a survey in Germany and reported that e-scooters mainly substitute walking rather than other transport modes. Another research in Germany by Gebhardt, Ehrenberger et al. (2022) reported that e-scooters could replace 13% of daily car trips. Baek, Lee et al. (2021) claimed that it could be expected that e-scooters substitute town bus trips in Korea. Guo and Zhang (2021) reported that e-scooters could potentially compete with the taxi, lower cost, and leisure trip purposes.

There are a number of previous LCA studies of shared and private electric scooters from cities in other countries. The earliest of these studies comes from the USA (Hollingsworth et al., 2019), but there are also more recent studies from cities in Europe, such as Brussels (Moreau et al., 2020), Berlin (Severengiz et al., 2020), Paris (de Bortoli and Christoforou, 2020) and (de Bortoli, 2021). There is also a recently published review article describing gray literature (reports) (Badia and Jenelius, 2023).

The project is completely financed by the Swedish Energy Agency, starting January 15th 2021 and ending July 15th 2023. The project has been carried out by researchers at Chalmers and RISE.

Genomförande

The project has consisted of six work packages (WPs), each one described here.
WP1: state of the art, policies and good examples
In this WP we have studied regulatory frameworks, policies and instruments for e-scooters in a selection of Swedish and European cities. We have literature studies, interviews and meetings with operators and city representatives.
The literature review has included legal sources (legislation, preparatory work, practice and doctrine, etc.) reports and publications, official municipal documents and websites, and news articles etc.
We have gathered information on the handling of e-scooter in Stockholm, Gothenburg, Mölndal and Malmö through the project's reference group consisting of representatives from these municipalities and electric scooter operators. Information about some European cities' rules and policies has also been obtained through participation in an international workshop on geofencing, organized by the GeoSence project, and an event for the POLIS network in November 2021 and at a number of roundtable discussions on the management of micro-mobility management organized by Drive Sweden and RISE in 2022. We also participated in a webinar on micro-mobility successes in Scandinavia in October 2021. On June 16-17, 2022, we organized a on the policy work in eSPARK during a session on the management of free-floating e-scooter services, and a workshop for the exchange about e-scooter management. We have also collaborated with other projects working on electric scooter issues, which has contributed additional knowledge to the policy work and also the dissemination of information from eSpark.
The work was mainly performed by researchers at RISE with input from Chalmers.

WP2: Collection and analysis of e-scooter movement data
The work in WP2 consists of three different parts: data collection, data analysis and modeling.

Data collection
There are two primary data sources for this project: e-scooter sharing booking data, geo-coded data on sociodemographic and urban points of interest.
The first database is the e-scooter sharing booking data containing the following variables for each rental: vehicle ID, starting and ending time of the rental, geographic position of vehicles at the start and end time. The data are from different operators, including 18 different cities located in Europe and North

America, being (in alphabetic order): *Berlin, Copenhagen, Faro, Gothenburg, Helsinki, Krakow, Lisbon, Lyon, Madrid, Malaga, Malmö, Munich, Oslo, Paris, Poznan, Stockholm, Vienna,* and *Warsaw,* from different operators, resulting in approximately 10 million vehicle movements. The second database is Open Street Maps where geo-coded data of points of interest such as the number of residential and commercial buildings as well as transport-related variables such as the number of public transport stops available.

Data analysis
We first generated an algorithm code for merging sub-datasets. Followed by extensive data processing and filtering of the existing datasets. Inaccuracies in the datasets have been identified, for example, city classification, travel distance, and missing data.

Modeling
The aim of the modelling has been to quantify the effect of a neighborhood's characteristics on the demand for e-scooters. We have used two different methods: convolutional neural networks (CNN) and spatial regression. We compare their performance as well as their out-of-sample predictive power when predicting the e-scooter sharing demand for a new city. The models describe a relation between the number of bookings (dependent variable) and spatial characteristics of the neighborhoods (explanatory or independent variables). There has been a growing recognition of spatial dependencies in transport studies (see, e.g., Caspi et al., 2020; Becker et al., 2017). Spatial dependencies exist if the value of the variable of interest at a given location is dependent on the values of the same variables at other locations in the system. In this case, the number of e-scooter sharing bookings in a given neighborhood not only depends on the spatial characteristics of its neighborhood but also on the number of bookings in the adjacent neighborhood.
The work was mainly performed by researchers at RISE with input from Chalmers.

WP3: Surveys and interviews
Three different data collection methods were carried out in WP3. Initially, we conducted two literature reviews with a comprehensive search across Scopus, Web of Science, and Google Scholar databases, emphasizing e-scooter usage patterns, riding experiences, safety, and accident patterns. For the first on user patterns and level of service we examined 386 papers and, following a rigorous screening process, individually reviewed 46 relevant papers. Similarly, for the review focused on safety analysis, we performed a comprehensive search of 2588 papers and, after careful screening, individually reviewed 108 papers. Further information on the methodology adopted can be found in (Kazemzadeh & Sprei, 2022 and Kazemzadeh, Hagani & Sprei, 2023). To capture users' experiences, we conducted a series of 12 semi-structured interviews (60% were frequent e-scooter users) and employed the in-vivo coding technique to analyze the transcribed data.

Notably, 60 percent of the interview participants were frequent users of e-scooters, providing valuable insights into their experiences and perspectives.

We collected data through an online survey during the last week of April and the first week of May 2022, specifically targeting individuals aged 16 and above in Gothenburg and Stockholm. In total, we initially collected 1806 responses, 62 % from Stockholm and 38 % from Gothenburg. In the sample, 49 % were identified as frequent e-scooter users (using e-scooters several times per day), while the remaining 51 % were categorized as non-users. To quantify the modal substitution resulting from e-scooter usage, we utilized the Propensity Score Matching method to obtain unbiased estimates and create an artificial control group to address potential biases. Further analysis of the substitution effect was studied using random parameter logit models.

The work was mainly performed by researchers at Chalmers with input from RISE.

WP4: Resource and energy use

We have made an LCA for two different cases of electric scooters. Case 1 corresponds to the first-generation electric scooter on the Swedish market; weight about 15 kg, non-replaceable battery and difficult to maintain and repair (parts of the bike cannot be easily replaced). Case 2, which corresponds to a model that most actors have introduced since 2020 and which is significantly heavier (just over 30 kg), has a replaceable battery and is easier to repair. For both cases, the vehicles used for collection also differ. For Case 2, some e-cargo bikes are used to collect batteries. The total distance that service/collection vehicles need to drive to collect and charge batteries is significantly shorter for Case 2. The assumed lifetime of the Case 2 scooter is significantly longer than for Case 1. We have performed a sensitivity analysis on the lifetime of both electric scooters.

The description of Case 1 and Case 2 has been developed based on data and information from two companies that provide shared electric scooters in Swedish cities. This data is supplemented with data on usage collected in WP2, the literature and the LCA database Ecoinvent.

The work was mainly performed by researchers at RISE with input from Chalmers.

WP5: Summary and recommendations

Besides collecting and analyzing the results from WP1-4 an internal workshop was conducted with the researchers from all WPs. The results and insights from this where later presented at an online seminar with stakeholders (representatives from municipalities, e-scooter companies, public transport providers, researchers) that could give input through discussion and Mentimeter. From this a policy brief with recommendations was produced.

Throughout the project three reference group meetings were carried out. The reference group consisted of representatives from Transportstyrelsen, Göteborg stad, Stockholm stad, Mölndal, Malmö, and e-scooter providers. During the meetings results from the project were presented and input was provided throughout the project.

The work was led by a researcher from Chalmers with input from all researchers in the project.

WP6: Project leadership
Monthly meetings were carried out online and in person. Reporting to the Swedish Energy Agency was also performed according to schedule.

Resultat

Results are presented per WPs.

WP1: state of the art, policies and good examples
The results comprehend an overview of existing legislation at national level and policy instruments in different cities both in Sweden and in selected cities in Europe such as Olso, Rejkvaik, Helsinki, Copenhagen and Paris.
The policy instruments used in Swedish and European cities are mainly dialogue, voluntary agreements, permit systems and procurement. Dialogue and voluntary agreements have initially been important tools for achieving a more manageable situation for e-scooters in several surveyed cities. Some Swedish and European cities still only apply dialog and voluntary agreements as policy instruments for managing e-scooters. At the same time, more and more Swedish cities have started to require a police permit (with conditions) under the Public Order Act for the placement of e- scooters in public places and also charge fees for the use of such space. Also, some European cities have also moved towards a permit system, such as Oslo in Norway.

WP2: Collection and analysis of e-scooter movement data
Calculations have been made on average rental time, mileage, etc. and how these are distributed over the day, between days of the week and over seasons. Figure 1 shows the average number of trips per scooter used during weekdays in different cities. Also, the number of electric scooters available, analysis of electric scooters' state-of-charge (SOC) consumption, average trip duration, average number of trips per electric scooter in different periods, e.g., per day of the week, per hour of the day.
Calculations for each trip's "idle time", being, the time that the electric scooters stand still, i.e., the time between the end of the registered trip and the subsequent registered start of the trip for each individual electric scooter.
Calculations of each electric scooter's journey, as well as downtime; geographical movement distances (geographical and routing), duration/time of standstill (geographically and route-wise), and geographical bearing for each trip.

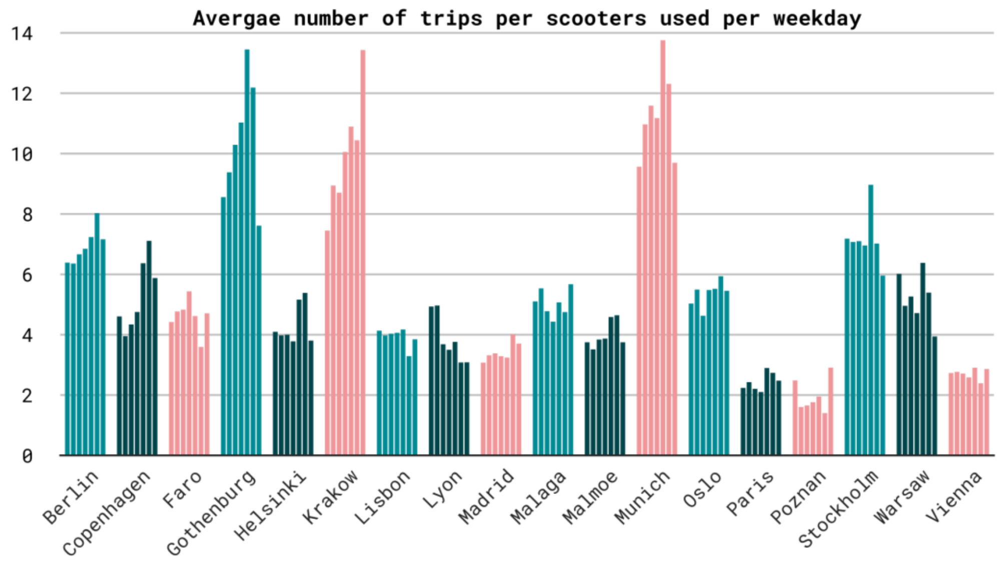


Figure 1 Average number of trips per e-scooter used per weekday.

We estimated/trained our models on Stockholm and used them to predict the spatial demand for Gothenburg. Our results show that the most influential factors are bike-sharing stations, taxi stations, nightlife venues (such as bars and restaurants), subway stations, and overnight accommodations (like hotels and hostels). All variables positively impact demand, except for railway stations.

Using spatial regression, we can accurately predict service areas in Gothenburg. However, precise prediction of areas with the highest demand remains a challenge due to the low number of such areas. The main reason is the low number of areas with high demand. While CNN is less effective in predicting service areas, it may perform better in predicting the highest trip volume areas. One possible explanation could be that the dataset may not be sufficiently extensive for CNN to perform the best.

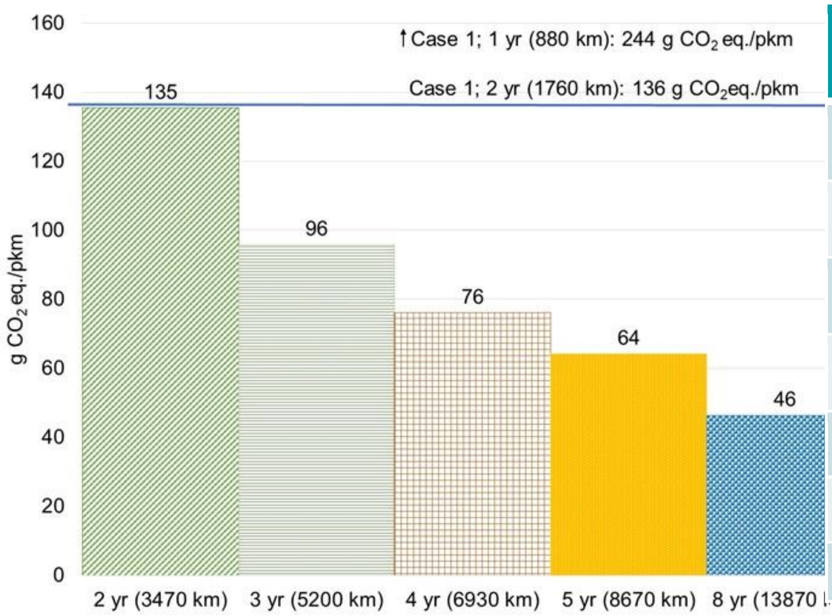
WP3: Surveys and interviews

Our literature reviews confirmed that e-scooters can potentially replace both motorized vehicles and active mobility. As a result, it becomes crucial to evaluate the user experience in both scenarios to gain a comprehensive understanding of the overall scooting riding experience. Additionally, it is essential to examine the interaction between e-scooters, cyclists, and pedestrians to ensure the smooth adoption of this mode of transport. Our analysis of safety concerns revealed that head and face injuries are the most common types of injuries reported among e-scooter riders involved in collisions. Notably, the lack of uniform regulations specific to e-scooters as a unique mode of transport has the potential to impede their safe adoption.

We analyzed our survey results based on 805 respondents after cleaning of data. The findings revealed diverse travel behavior among e-scooter users. Frequent e-scooter users are men, middle age, with children between 7 to 12, having a driving license, and a high-income job. They are often frequent car users and/or hold a public transport card. Being an e-scooter user increased the likelihood of shifting trips under 4 km to e-scooter usage by 46%. From the logit model analysis, we found that participants were more inclined to replace their current modes of transport with e-scooters on sunny days and for work-related trips. These insights emphasize the role of contextual factors, such as weather conditions and trip purposes, in driving modal shifts towards e-scooters.

WP4: Resource and energy use

The part of the life cycle that contributes most to the total environmental impact (the categories evaluated are climate impact, total energy use, and resource use of minerals and metals) is the production phase. The lifetime mileage has a large influence on the result. Lifetime mileage is affected by the intensity of use (the number of trips per e-bike and the length of each trip) and by the number of calendar days the e-bike is used. The results show that the lifetime mileage needs to be doubled (or almost doubled) for the heavier electric scooter (Case 2) to have a lower environmental impact than the lighter electric scooter (Case 1).



Lifetime	Case 1	Case2
yr	[km/scooter]	
1	880	
2	1760	3470
3		5200
4		6930
5		8670
8		13870

Figure 2 Climate impact of Case 2 for different assumptions regarding lifetime (lifetime milage) (staples) compared to Case 1 results (line and text at the top). Values are given in g CO2 equivalents per person kilometer travelled.

The results from WP5 are presented in the “Diskussion” section.

Discussion

Based on current usage patterns the carbon benefits of e-scooters are questionable despite the fact that companies have systematically been improving the vehicles and operations for safety, durability and carbon footprint. In the production phase, aluminum production and battery production make the largest contributions to the environmental impact. Trying to reduce these therefore has great potential to reduce the overall environmental impact of e-scooters. If electric scooters can be made lighter and there is no need to add more resource-intensive materials or shorten their lifespan, the environmental impact can be further reduced.

From the user phase, it is mainly the collection of the e-scooters (charging, repairs and redistribution) that is of great importance and here we have seen a positive development with a reduced impact over time. The electricity used to charge the batteries does not have such a large climate and environmental impact as Swedish electricity production is largely from renewable sources. However, the contribution is clearly visible when analyzing the total energy demand.

End-of-life for electric scooters has not been analyzed to any great extent in previous studies. Our results show that the impact is not so great from this phase and by reusing working parts as spare parts, you can also reduce environmental and resource consumption for spare parts. Our estimate of the impact of the spare parts has not taken this into account and the estimate of the environmental impact of the spare parts is probably an overestimate.

E-scooters are being used by mobile people in areas with a lot of activities. E-scooters could alleviate congestion both for cars and in public transport in central areas in cities with heavy traffic but may increase traffic on bike lanes. One core issue is thus how public space is allocated in cities. Allowing for more space for active modes and e-scooters can benefit the substitution away from car use.

Currently, e-scooters share space with pedestrians and cyclists, creating potential safety hazards. This is due to the varying navigational characteristics of e-scooters, such as their speed compared to walking and cycling. Additionally, their relatively compact size and agility might increase the likelihood of interaction with other road users. There is thus a double concern: an increased risk of accidents and a reduction in usage of e-scooters which in its turn will increase the carbon footprint of the e-scooters. As the number of users of e-scooters increases and the type of accidents change due to the design of the scooters. This will increase the importance of policy on compensation issues and insurance products. Our prediction is therefore that insurance issues will become increasingly important.

From a national perspective new parking regulations were introduced in September 2022. These imply that e-scooters may only be parked on a footpath or cycle lane if they are parked at a parking space intended for bicycles (e.g. a bicycle rack or a designated space for bicycles/e-scooters). Companies also apply geofences (geofencing) to control where the e-scooters can be parked.

Cities need to understand how regulations affect how much e-scooters are used and their lifetime. Regulating the use and parking of e-scooters is central, however, these regulations should be carefully designed not to reduce the utilization rate of the e-scooters or shorten their lifetime. There is e.g. a large risk that shifting from free-floating to more station-based will decrease the usage of e-scooters. Cities should thus follow up on how new regulations affect e-scooter usage and lifetime, and thus the environmental footprint of the e-scooters.

We believe that cities and operators should have an active dialogue on how e-scooters can best be integrated into the local transportation system to contribute to transport efficiency, without creating public creating problems of order and safety in the city. Cities should also exchange experiences with each other and work together on common challenges related to e-scooters. This can contribute to greater coherence and common approaches, which in turn can help make things easier and more predictable for operators. The latter are often active in several cities simultaneously and can experience major challenges in that the conditions for their operations differ from city to city.

Publikationslista

Holmgren, K.M., Einarson Lindvall, E., Rosell, J. (manuscript accepted for presentation) ***Life Cycle Assessment of Shared Dockless Stand-up E-scooters in Sweden***. SDEWES 2023 Dubrovnic.

Kazemzadeh, K. and F. Sprei, 2022. *Towards an electric scooter level of service: A review and framework.* Travel Behaviour and Society, 2022. **29**: p. 149-164

Kazemzadeh, K., M. Haghani, and F. Sprei, 2023 *Electric scooter safety: An integrative review of evidence from transport and medical research domains.* Sustainable Cities and Society, 2023. **89**: p. 104313.

Kazemzadeh, K. and F. Sprei, *The effect of shared e-scooter programs on modal shift: Evidence from Sweden.* Submitted to journal. Preprint available at : https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4494457

Kazemzadeh, K. and F. Sprei. Exploring the determinants of modal shift to e-scooters in Sweden. Working paper

Abstract
The rapid popularity of e-scooters in the transport system has reinforced the need for analysis to understand their role in modal substitution. We surveyed 1107 Swedes and developed binary logit models to assess the impacts of various contributing factors on participants' decisions to replace their frequent modes with an e-scooter. We considered five types of variables, including socio-demographic factors, travel habits, trip characteristics, weather conditions, and user mood in their modal substitution decision. Our findings indicate that participants are more likely to replace their current modes with an e-scooter when the weather is sunny and for work trips. Furthermore, frequent e-scooter users, those with monthly e-scooter subscriptions, and e-bike owners are more likely to shift to e-scooters. Our study provides insights into the travel behaviour of e-scooter users in Sweden. The findings imply that contextual factors such as weather conditions and

frequency of e-scooter use are essential determinants of the modal shift towards e-scooters in Sweden.

Lundahl, J. & Stenberg, S. 2023. Elsparkcyklar från ett policyperspektiv. Available at https://www.ri.se/sites/default/files/2023-06/Policy%20brief%20eSPARK-policyarbetet.pdf

Sprei, F, Kazemzadeh, K., Faxer, A, Lindvall, E, Lundahl, J, Rosell, J, Melnyk, K, Holmgrern, K, Habibi, S, Stenberg, S, Petterson, S, Wedlin, J, Engdahl, H,. 2023 How can e-scooters better contribute to a sustainable transport system? Available at: https://www.ri.se/sites/default/files/2023-06/Policy%20brief%20eSPARK-final.pdf

Konferenser och andra sammanhang där resultat från projektet presenterats

Results from the project have been presented at several workshops,webinar and events which have led to interactions with other projects as well. Here is a list of these interactions and events.

- Presentation at the webinar sustainable transportation – meeting the urban challenge – Embassy of Sweden, Kuala Lumpur (2021-07-21)
- Webinar Vianova: Scandinavian success in micro-mobility - summer 2021 ! | October 2021 (2021-10-07)
- Policy Issues related to e-scooters Network Micromobility (2022 – 04-04)
- Workshop at Transportforum 2022 (2022-06-16 – 2022-06-17)
- Försäkringsrättslig dagen, Göteborgs universitet (2022-10-13)
- Project presentation (2021-11-30) and continuous experiences exchange with JPI Urban Europe project GeoSense
- Poster presented and in proceeding SAIS 2022 Workshop, Stockholm, (2022-06-13&14).
- Electric scooter parking practices: understand the issues, EVS35, Oslo,(2022-06-11 to 15)
- Projektet eSPARK – hur hanteras friflytande elsparkcyklar? Presentation at Transportforum 2022 (2022-06-16 – 2022-06-17)
- The Swedish Transportation Research Conference, Who are electric scooter users? Evidence from Gothenburg and Stockholm, (2022-10-18–19)
- An in-depth understanding of powered micro-mobility safety issues: a qualitative study, International Cycling Safety Conference, (2022-11-08 to 10)
- Presented at 16th International Association for Travel Behaviour Research, (IATBR) Conference in Santiago, Chile, (2022-12-11 to 15)
- Project result presentation at Network Micromobility (2023-03-14)
- Investigating e-scooter adoption in the Swedish context: Lessons learned from the eSpark project, The Swedish Transportation Research Conference, 18–19 October; 2023, Abstract submitted.
- In parallel to conducting the LCA of the Swedish shared e-scooters, Elin Einarson Lindvall also participated in the working group on Micromobility Emissions

Assessments lead by NUMO (New Urban Mobility alliance). That work resulted in the following publication: Assessing the Environmental Impact of Shared Micromobility Services: A Guide for Cities.

- Continuous dialogue with e-scooter providers for data

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