Nordregio

Planning memo 2

Data, communication, and political advocacy

LISA ROHRER & JONAS KAČKUS TYBJERG

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Introduction

In addition to manual counts and observational studies, many Nordic cities use automatic counters in strategic locations. Pictured here is one such counter in Odense, measuring cyclist volumes along the route. Source: Alexander Farnsworth / iStock

Which came first: the plans or the data? While perhaps not as known as the classic "chicken or the egg" dilemma, the question may be just as timeless. While working with urban and regional development, traffic and mobility planners need to collect robust data to design and make a case for quality cycling planning and infrastructure projects. However, they also need well-developed plans to know which data to collect. Alongside both qualitative and quantitative data, planners in the Nordic Region also work with a range of communication methods to gain support for cycling projects that enable safe and connected transport and improved quality of life for all residents.

In this planning memo, we review the latest academic literature around **data, communication, and political advocacy** from the Nordic Region. We also summarise how several Nordic cities and regions work with data and communication in their cycling strategies.

From the academic literature, we found that awareness campaigns are often discussed in relation to improving cycling safety, especially for children. When it comes to collecting and making decisions based on cycling data, studies highlight the importance of mixed methods approaches and describe nuances for data collection.

Based on a policy review, we found that local and regional strategies emphasise the role of branding their city as a cycling city, educating young people and newcomers about cycling norms, improving wayfinding, and making targeted campaigns to improve the safety and experience of cycling, thus encouraging more people to choose the bicycle.

Nordic cities and regions gather cycling data through surveys, trackers and manual counts, and sources like traffic accident reports. The municipalities and regions work with this data to gain insights on number of cyclists, times of travel, perceptions of cycling, and qualities of cycling infrastructure, among other figures. The City of Helsinki offers several noteworthy practices in their work with data, especially when it comes to monitoring frameworks, extending beyond cycling counts and road quality and including more reflective data on, for example, how many municipal employees work with cycling and how the city's cycling investments compare to other top cycling cities.

Ongoing challenges for Nordic cycling practitioners include sorting and making use of available data, ensuring that the right data is collected with the available budgets, and

combatting the backlash that they often face in their work to make safer and more accessible environments for all residents.

This is the second memo in a series summarising research and policy concerning bicycle planning in the Nordic countries. The aim is to provide practitioners, policymakers, researchers, and other actors with insights into the academic discourse, to highlight how Nordic cities and regions are working with the topic, to note useful tools and initiatives, and to identify ongoing challenges. In doing so, the memo seeks to support informed decision-making for transport planning in the Nordic Region. The content of this memo was developed based on desk research as well as inputs from an online workshop held in November 2025 among the Nordic Cycle Network—a network of practitioners from around 20 cities and regions across Denmark, Finland, Iceland, Norway, and Sweden.

Introduktion (dansk)

Udover den manuelle optælling af cyklister og observationsbaserede studier bruger mange nordiske byer automatiske tællere på forskellige strategiske placeringer. På billedet kan man se en af disse tællere i Odense. Den registrerer antallet af cyklister på en specifik rute.
Kilde: Alexander Farnsworth / iStock

Hvad kom først: planerne eller dataene? Selvom spørgsmålet måske ikke er så kendt som det klassiske dilemma om hønen eller ægget, er det måske lige så tidløst. I arbejdet med by- og regionsudvikling har trafik- og mobilitetsplanlæggere brug for solide data for at kunne designe og argumentere for god cykelplanlægning og infrastrukturprojekter. Samtidig har de brug for veludviklede planer for at vide, hvilke data der skal indsamles. Ud over både kvalitative og kvantitative data arbejder planlæggere i Norden også med en række kommunikationsmetoder for at skabe opbakning til cykelprojekter, der giver sikker og sammenhængende transport og forbedrer livskvaliteten for alle borgere.

I dette notat gennemgår vi den nyeste akademiske litteratur om **data, kommunikation og politisk fortalervirksomhed** i Norden. Vi opsummerer også, hvordan flere nordiske kommuner og regioner arbejder med data og kommunikation i deres cykelstrategier.

Den akademiske litteratur viser, at informationskampagner ofte diskuteres i relation til forbedring af trafiksikkerheden for cyklister, især børn. Når det gælder indsamling af cykeldata og beslutningstagning på baggrund af disse data, fremhæver studier vigtigheden af mixed methods-tilgange og beskriver nuancer i dataindsamlingen.

På baggrund af en politikanalyse fandt vi, at lokale og regionale strategier lægger vægt på at brande deres by som en cykelby, uddanne unge og nytilflyttere i cykelkultur og normer, forbedre *wayfinding* og gennemføre målrettede kampagner for at øge sikkerheden og oplevelsen ved at cykle og dermed få flere til at vælge cyklen.

Nordiske byer og regioner indsamler cykeldata gennem spørgeskemaundersøgelser, trackere og manuelle tællinger samt kilder som trafikulykkesrapporter. Kommuner og regioner bruger disse data til at få indsigt i blandt andet antal cyklister, rejsetider, oplevelser af cykling og kvaliteten af cykelinfrastrukturen. Helsinki kommune tilbyder flere bemærkelsesværdige praksisser i deres arbejde med data, særligt i relation til overvågningsrammer, der rækker ud over traditionelle cykeltællinger og vejstandarder. Disse rammer inkluderer også mere refleksive datatyper, såsom antallet af kommunale medarbejdere, der arbejder med cykling, samt hvordan byens cykelinvesteringer sammenlignes med andre førende cykelbyer.

Løbende udfordringer for nordiske cykelfagfolk omfatter sortering og anvendelse af tilgængelige data, sikring af at de rette data indsamles inden for de givne økonomiske

rammer samt håndtering af den modstand, de ofte møder i arbejdet med at skabe mere sikre og tilgængelige miljøer for alle borgere.

Dette er det andet notat i en serie, der opsummerer forskning og politik om cykelplanlægning i de nordiske lande. Formålet er at give fagfolk, beslutningstagere, forskere og andre aktører indsigt i den akademiske debat, fremhæve hvordan nordiske byer og regioner arbejder med emnet, pege på nyttige værktøjer og initiativer samt identificere aktuelle udfordringer. Dermed har notatet til formål at understøtte velinformeret beslutningstagning i transportplanlægningen i Norden. Indholdet er udviklet på baggrund af desk research samt input fra en online workshop afholdt i november 2025 blandt Nordic Cycle Network – et netværk af praktikere fra omkring 20 kommuner og regioner i Danmark, Finland, Island, Norge og Sverige.

What does the research say?

Awareness campaigns tend to emphasise helmet use and children's safety. Pictured here is a busy junction in Gothenburg where cyclists share space with pedestrians, cars and trams.
Source: Sofia Sabel / imagebank.sweden.se

Data, communication, and political advocacy often work together. However, reviewing recent scholarship about these ideas presents challenges. Various methods for data collection are present in every study on cycling, and communication—whether in the form of public awareness-raising campaigns or political advocacy—is often mentioned as an implication of the research without further clarification on how to operationalize such work.

Despite these obstacles, some studies have been made in the past decade that evaluate the effectiveness of communication efforts or test new methods for data collection. Based on a literature review conducted in Autumn 2025[1], the Nordic countries focus on several ideas at the intersection of data, communication, and advocacy. These include awareness campaigns for improving cycling safety; how and where cycling is visually portrayed through campaigns, media, and political communication; mixed methods approaches for collecting and analysing data; and factors that should be considered in data collection or indicator lists to account for various nuances.

Awareness campaigns for improving cycling safety

When it comes to developing campaigns, much of the research focuses on safety campaigns, especially around helmet use and/or targeting children's safety. For example, a recent (2025) study in Odense suggests that campaigns should focus on children's bicycle safety to reduce injuries or the severity of injuries since there is a high number of bicycle-related injuries among young children (Thorsdottir et al., 2025). In a study considering barriers and factors that contribute to helmet use among children and parents in Norway, Lajunen (2016) found that children reported using a helmet less frequently than adults. Low helmet use among children was correlated with the belief that a helmet was unnecessary or with a preference towards wearing a cap or hat

1. A literature review was conducted using the Scopus database in October 2025 using keywords such as *bicycle*, *communication*, *political advocacy*, *campaign*, and *data*. A total of 26 open-access articles were reviewed.

instead. In contrast, habitual helmet use and an increase in perceived safety when riding were key factors correlated with children wearing helmets. Rather than using "scare campaigns", which may inadvertently reduce cycling instead of improving safety, the researchers point to other safety awareness ideas. Campaigns for encouraging children to use helmets could, for example, showcase peers their own age since "among children, having friends who use a helmet was also an important correlate of helmet use" (Lajunen, 2016) or with school-based interventions. A study in Denmark also suggests that there may be a tendency for others to buy into the idea of wearing a helmet if they see role models wearing them, or if wearing a helmet becomes normalised (Olsson, 2025). These ideas somewhat contrast the message from Thorsdottir et al. (2025) who suggest that policy measures may also be required for combatting safety concerns among children cyclists. This could involve increasing the minimum age requirement for riding independently—in Denmark, the minimum age is 6 years old, while in Iceland, for example, the age is 9 years old.

In a later study made by Lajunen and several colleagues (2025), the researchers claim that adolescents (compared to younger children) are more influenced by their peers than by adults. This means interventions "should focus on … an internalized personal safety norm," and encouraging them to "perceive helmet use as part of their identity—rather than something imposed by parents—may increase adherence in adolescence and adulthood" (2025, p. 133). Strategies such as "peer-led safety campaigns, integrating helmet use into youth cycling culture, and reinforcing positive social norms around helmet-wearing could help sustain these behaviours beyond childhood" (2025, p. 133). They also propose things like "helmet days", workshops within schools or communities to raise awareness around benefits and safety risks, and behaviour nudges "such as providing free or subsidized helmets and encouraging parents to sign helmet pledge programs" (p. 133).

In Denmark, helmet usage has significantly increased among school children since 2004 (from 33% to 79% in 2022) as well as among adults (6% to 50%; Olsson, 2023). Olsson suggests that, while several factors may contribute to this behaviour change, one factor may have been the "nationwide focus on traffic safety education and behaviour change campaigns to encourage helmet wearing" (Olsson, 2023, p. 54). The author points out that legislation mandating bicycle helmets in Denmark is not necessary in order to see a change in bicycle helmet use; rather, "persistent behaviour change campaigning and education, stakeholder consensus, higher levels of road safety-oriented behaviours, and self-reinforcing processes could potentially be important factors" (Olsson, 2023, p. 54). The major waves of increased bicycle use between 2004-2010 and 2014-2020 align with the nationwide campaigns promoting wearing a helmet. Olsson concludes that communication is key: focusing on traffic safety education, national campaigns, and consensus among stakeholders who recommend wearing a helmet have a role to play for increasing helmet wearing. It is possible that similar results could be achieved through communication with regards to other cycling behavioural changes.

Lajunen's 2016 Norwegian study found that the main barriers for helmet use among adults were related to "helmets being uncomfortable, helmets not fitting to hairstyle, or helmets being too cold or hot" (p. 300). Thus, safety campaigns targeting such barriers and emphasising benefits could be an effective path. In relation to adult helmet use as

well, Lajunen et al. (2025) state that programmes related to both children and parents could be effective for targeting the household and making safety habits around cycling a "family-oriented activity" (p. 133). Indeed, Olsson (2023) shows how one of the major campaigns from 2014 in Denmark effectively targeted parents of preteen school children and contained humour and music in a memorable way for both children and parents. Reports from parents and children suggest that the videos were memorable and that families spoke about the campaign, which may have played a role in the rise of helmet use. However, it is important to recognise that such campaigns are only one of several factors at play. To be effective, campaigns must also sit alongside other road safety measures and improved cycling infrastructure (Thorsdottir et al., 2025), and interventions should be context specific, account for local perceptions, and use "culturally relevant messaging or leverage[e] community leaders as role models" (Lajunen et al., 2025, p. 133).

While many campaigns target children's safety and helmet use, Ryan et al. (2016) turned their attention towards a different population group. Focussing on the Swedish city of Malmö, they made a survey of older persons' perspectives on cycling. Through focus groups and a survey, the researchers conclude that "campaigns aimed at increasing the awareness and consideration of other road users towards older cyclists, as well as the introduction of clearer and more visible signage, could support older cyclists in prolonging their cycling, as well as improving the experience they have as they do cycle" (2016, p. 46). The researchers also suggest that campaigns which increase awareness of the health benefits of cycling could be another method to encourage people to continue cycling as they age.

Høye and colleagues (2020) studied the correlations between cyclist behaviours and use of safety equipment in Norway in order to understand whether it is sensible to promote cycling from a "safety gear" perspective. (In other words, developing campaigns that highlight cyclists wearing helmets, high-visibility clothing, and using lights). Through questionnaires about cyclists' behaviour, crash involvement, and safety equipment use, they concluded that "using bicycle lights and high-visibility clothing are negatively related to collision involvement" and using some type of safety equipment is associated with a greater likelihood of using additional safety equipment. For example, if one uses a helmet, they are more likely to also use a bicycle light). The results suggested that campaigns using models who wear safety gear was appropriate since using such gear was correlated, to some degree, with safer cycling behaviour and reduced collisions. However, showcasing cyclists in safety gear has been a point of contention in public discourse as it may lead to undue perceptions of cycling as dangerous or that cyclists hold full responsibility for their safety, while factors like road design, infrastructure, and other modes of transport also contribute.

In addition to the wide range of studies looking into helmet safety campaigns, alcohol abuse was also mentioned due to injuries sustained while cycling while inebriated. In their study of injuries related to e-scooters and bicycles in Oslo, Stray et al. (2022) recommend developing awareness campaigns and implementing stricter policies as a way to reduce the number of injuries. Based on the demographic insights of injuries related to scooters and bicycles, such campaigns could target teenagers specifically. A study made by the

Swedish National Road and Transport Research Institute (VTI) in 2021 investigated perceptions around cycling while mildly intoxicated from alcohol, given that there is no legally defined alcohol limit while cycling in Sweden (Warner, 2021). The study raises concerns around health and safety of cyclists based on high numbers of bicycle injuries and fatal crashes associated with alcohol intoxication, with suggestions to disseminate information or make campaigns to reduce alcohol intoxication in connection with cycling (2021). Somewhat in disagreement with Stray et al. (2022), Warner suggests using campaigns to influence behaviour change rather than focussing on policy.

Finally, awareness campaigns were also suggested by one Danish study looking at users' perceived safety of electrically assisted bicycles (Haustein & Møller, 2016). This could include, for example, communicating with the public about the growing presence of e-bikes and their higher speeds among conventional bicycle users or other mobility forms in shared spaces. The article also raises the point that e-bike education may be necessary before riding them in high traffic areas.

How and where cycling is visually portrayed through campaigns, media, and political communication

Academic studies also highlight ways in which communication methods—whether through campaigns, media, or political communication—portray cycling and how this influences people's perceptions of it.

In a study of urban bicycle tourism from Greater Copenhagen, Nilsson (2021) makes a document analysis of marketing material and media, alongside other planning and strategic documents. The case study emphasises the importance of communicating the values of bicycle tourism to local taxpayers because it can lead to public investment in bicycle infrastructure that supports residents. The report also highlights cycling as a key element of the region's brand, but with some distinctions between the Swedish and the Danish sides of the region (Nilsson, 2021, p. 1657). The Swedish material shows cycling as a rural, nature-based tourism activity, compared to the Danish material which focusses on urban contexts and modern lifestyles. In both cases, the images "reinforce the region's profile of being sustainable and progressive" and "as a visitor, you are invited to take part in this particular form of localness" (Nilsson, 2021, p. 1658). In their study of older persons' perceptions of cycling in Malmö, Ryan et al. (2016) also found that cycling is closely connected to identity. The researchers found that "cycling has reached the stage where it is ubiquitous in the city of Malmö, even for those in later life who have cycled for most of their lives and see cycling as an inherent element of their everyday mobility" (p. 46).

Another study from Sweden evaluated the national cycling strategy compared to cycling advocacy initiatives and online blogs to determine how different communication forms discuss cycling and influence mobility trends (Balkmar, 2020). The study shows that there are distinct visions of cycling (or "future imaginaries") provided by top-down compared to bottom-up media. While the national strategy conveys a positive initiative for increasing cycling, it "fails to move beyond the existing mobility paradigm or to explicitly call for interventions to restrict car driving," thereby emphasising change on the part of cyclists

rather than car-drivers (Balkmar, 2020, p. 336). Advocacy organisations like Cycling Sweden (*Svensk Cykling*) have launched initiatives that emphasise other benefits of cycling for the wider public which may have the potential to "mobilize the political energy that is required to enact the necessary transformations to make a different future possible" (p. 337). The author highlights how online blogs make more critical and radical comments on the topic from the perspective of cyclists, enabling them to "define their own situation and use the forums to co-think alternative ways of practicing sustainable mobility" including making calls for justice and imagining alternative futures which remain limited in the national strategy (p. 337). Overall Balkmar's article highlights the need for cycling politics to be a joint effort between top-down and bottom-up perspectives.

When it comes to *where* campaigns take place, one study suggested an urban-rural divide (Hiselius & Svensson, 2017). The researchers surveyed local transport planners in Swedish municipalities who worked with e-bike campaigns including demonstration projects, e-bike rentals, and other media and local press campaigns to promote e-bike use. About half of the 38 surveyed municipalities reported that they conducted campaigns related to increasing e-bike use, with most campaigns focusing on trips within the city or between cities and their surrounding towns (compared to trips in rural contexts). But, due to the sustainability potential of increased cycling in rural areas, the authors argue that it may be more effective for e-bike campaigns to target rural areas.

Communication measures can come in various forms. A Swedish study claims that "pull" measures for climate-related passenger transport had greater support than "push" measures and bans (Habla et al., 2025). This could have major influence on communication within local and regional strategies as well as greater policymaking. The study also highlights political tensions that make communication and political advocacy for cycling a challenge. For example, their results suggest "a strong rivalry between the different modes of transport, where citizens tend to disagree [over] subsidizing the mode of transport that mainly competes with the mode of transport they primarily use" (Habla et al., 2025, p. 18). The authors also note that, due to large numbers of undecided citizens with regards to climate-related transport policy measures, "appropriate information provision through targeted campaigns and communication strategies could be an important tool. Governments could increase transparency about the expected outcomes of the climate-related transport policies, which could enable undecided citizens to make informed decisions" (Habla et al., 2025, p. 18).

Methods for collecting and analysing data

While many articles focus on campaigns and communication, there are also several key insights in the literature describing which methods work best for collecting cycling data. The research also shows the importance of combining qualitative and quantitative datasets. For example, in a Gothenburg-based study, researchers used data from an accident database, but they also made observational studies and interviews of cyclists who self-reported unsafe episodes to understand "subjective risk perception" (Werneke et al., 2015). With regards to data collection, their work points to the significance of combining naturalistic data with other qualitative methods to provide a more complete

picture of "safety-critical" situations. They also highlight the importance of data points around uncomfortable/unsafe situations which are unlikely to be included in accident databases. This is especially valuable data to collect about cyclists since a non-crash event can still have a significant impact on perceptions of safety and comfort. In other words, assessing instances which result in death or injury give an incomplete understanding of the safety conditions of a transport route.

Studies on perceptions of comfort and safety were explored in another Swedish-based study, in which the researchers compared responses based on *where* questionnaires were administered: out in traffic versus online (Kazemzadeh et al., 2021). The study concluded that, when answering questionnaires online, cyclists were more positive and optimistic compared to answering while in traffic. There were also distinctions regarding the types of questions they were asked—strategic (holistic view of cycling at the city-level), tactical (perceptions about their frequent routes), or operational (perceptions of a specific location). The study highlights how the context in which surveys are conducted can make a difference. This also has implications for how researchers and planners administer and interpret data from surveys with regards to cycling. "Planners and academics could coordinate their data collection methods (in-traffic or online) based on the chosen level of analysis. For instance, when what is needed is the evaluation of the strategic and tactical aspects of a given infrastructure, we have demonstrated that the survey method does not affect the results; hence it is expected that the responses would be quite similar" (Kazemzadeh et al., 2021, p. 537). However, when it comes to operational level questions, it may be useful for questionnaires to be administered *in situ*.

Mixed qualitative and quantitative data approaches were also encouraged by Argyros et al. (2024). who used trajectory data from Hövding airbag helmets alongside OpenStreetMap data and bicycle traffic flow data from Copenhagen's COMPASS flow data. Another study looking at cycling perceptions from Malmö combined questionaries by post with focus groups to gain a more nuanced understanding of their target group (Ryan et al., 2016). When it comes to collecting data about perceptions, researchers in Finland found that participatory evaluation methods played an important role, not only in collecting information about children's enthusiasm towards cycling, but also "as an activating measure in its own right" (Kunnasvirta et al., 2026, p. 574).

The academic literature also highlights other tools for data collection, such as bicycle counters for measuring bicycle traffic flows (Holmgren et al., 2017), Bluetooth and Wi-Fi sensors for collecting travel times from bicycle traffic (Ryeng et al., 2016), and video analysis through drones to understand cycling conditions and to evaluate microscopic movements (Yastremska-Kravchenko et al., 2024). In the latter case, researchers evaluating cyclists in Linköping and Lund argue that drone footage (rather than ground-based cameras) provides "near elimination of mounting and power supply issues … one camera view covering a large area of interest …, and the drone's perspective and relatively large distance from the subjects observed" (Yastremska-Kravchenko et al., 2024, p. 2). But these technological methods also have some caveats. In a Norwegian study, Ryeng and colleagues (2016) found that, while Bluetooth and Wi-Fi sensors were successful data collection tools, they still needed to employ a filtering system to ensure collection of cycling traffic alone (distinct from car traffic) in the dataset.

Cycling indicators

Beyond methods, several academic articles identify unique indicators or factors that should be considered when collecting cycling data. One study notes the importance of monitoring things like surface quality within cost-benefit analyses to ensure effective investments lead to better comfort, safety, and accessibility (Argyros et al., 2024). Another considers the heterogeneity of cyclists themselves when evaluating bicycle traffic flows (Perez-Castro et al., 2025). When it comes to safety indicators, Utriainen et al. (2018) used data from Sweden and Finland (as well as the Netherlands) to understand how data on "seriously injured" individuals could be combined with "fatalities" as a valuable, combined indicator rather than looking at fatalities alone. In part, this is because the costs of accidents resulting in injuries is often higher than the cost of fatal accidents and includes the impact of sustained human suffering and other public health consequences from injuries. The idea of looking beyond the most dramatic result of traffic accidents to understand cycling safety resonates with Werneke et al. (2015).

The most in-depth study on cycling indicators comes from a Stockholm-based study which builds up a bikeability index (Paulusová & Sharmeen, 2025). In previous research, the authors developed a school bikeability index based on a literature review evaluating children's possibilities to cycle to school (Paulusová & Sharmeen, 2024). The index considered factors such as cycling infrastructure, connectivity and urbanization, safety, and the surrounding environment (see Table 1). Since then, they refined the index to focus on only local, built environment factors, contextualised the index for Stockholm, and then measured the bikeability for children based on the indicators.[2] The revised version contains fourteen key categories and a list of detailed indicators (see Table 2) that can provide insights into strengths as well as remaining areas that require prioritization to improve bikeability for school children in the city (Paulusová & Sharmeen, 2025). Notably, the authors suggest future research to refine the index, validate index weights, and include more indicators based on local contexts.

2. In their study, Paulusová & Sharmeen (2025) found that the "most important factors influencing children's bikeability were the availability of bicycle parking at school, the degree of urbanisation, and the speed limit at the school entrance. Conversely, the least important factors were physically separated bicycle infrastructure, bicycle infrastructure connected to the school entrance, and intersections with bicycle infrastructure" (p. 11). Such indicators are valuable for future data collection by city officials and researchers alike to continue to understand the which factors provide support or hinder different population groups from cycling.

Table 1. School bikeability index. (Source: Paulusová & Sharmeen, 2024)

INDICATOR	NECESSARY DATA
Cycling infrastructure	
Presence of bicycle infrastructure	A dataset detailing the location of cycling infrastructure, not necessarily distinguished by type, and a road network dataset
Type of bicycle infrastructure	A dataset detailing the type of all segments of available bicycle infrastructure. The typology should be based on the built characteristics (shared street, bicycle lane, shared or exclusive bicycle path), rather than on the use type (main v. local network)
Width of bicycle paths	A dataset specifying the width of available bicycle paths
Pavement type and quality	A dataset describing the type of pavement of existing bicycle infrastructure. Additionally, a subjective quality assessment of the pavement might be used
Quality of bicycle infrastructure at intersections	A dataset describing the presence and type of bicycle infrastructure at intersections (e.g., bicycle passages and crossings, and traffic lights for cyclists
Signage/signalling	A dataset of signage presence, plus a potential readability and usefulness assessment
Bicycle parking	A dataset on the presence of bicycle parking. Ideally specifying its size and type
Obstacles on bicycle path	An objective dataset on the presence of obstacles such as bollards and gates, and construction work. Plus a subjective assessment on obstructions, such as illegally parked cars
Connectivity and urbanisation	
Street connectivity/intersection density	A road network dataset
Degree of urbanisation	Population density data at a spatial grid
Safety	
Traffic control devices and speed limiting measures	A dataset on locations of such decides and measures
Bicycle traffic volume	A dataset on bicycle traffic volumes, measured at various places across the city
Traffic volume	A dataset on traffic volumes with high-enough density of measuring points
Lighting	A dataset on the availability of public street lighting
Traffic speed	A dataset on the maximum allowed traffic speed for each road segment
Road type	A dataset on the classification of all road segments
Collisions	A spatial dataset on the occurrence of collisions that involved a bicyclist
School site entrance location and school zones signage	A dataset on the presence of school zones and position of school entrance
Criminality	A dataset on the rate of criminal offences occurring the in area, or a subjective data rating on the perception of crime-safety in the area
Pedestrian traffic flow	A dataset on pedestrian traffic volumes in each area
Surrounding environment	
Slope	Elevation data, also ideally of the road network
Aesthetic and attractiveness	Design characteristics of the built environment. Ideally, a subjective judgment of area aesthetics and attractiveness to be cycled
Air quality	Air pollution data with detailed resolution
Natural elements	A dataset on the presence (and extension) of natural elements, such as parks and forests

Table 2. Refined school bikeability index with built environment focus. (Source: Paulusová & Sharmeen, 2025)

INDICATOR	NECESSARY DATA
Cycling infrastructure	
Cycling network	Length of bicycle network compared to the total length of the road network within the buffer zone
Recommended cycling infrastructure for children	Length of bike lanes along roads with a maximum speed limit of 30 km/h and physically separated bicycle paths within the buffer zone, compared to the length of the road network
Physically separated infrastructure	Length of physically separated bicycle paths (both shared with pedestrians and exclusive for cyclists) within the buffer zone, compared to the length of the road network
Intersections with bicycle infrastructure	Number of road intersections with dedicated bicycle infrastructure (e.g., bicycle passage or crossing) within the buffer zone, compared to the total number of road intersections. Data on other types of bicycle infrastructure (e.g., bicycle boxes, traffic lights, etc.)
Connectivity of school with cycling infrastructure	Presence of a bicycle path or lane close to school entrance
Bicycle parking at school	Presence of bicycle parking at school (type not distinguished)
Connectivity and urbanisation	
Intersection density	Number of intersections within the buffer zone, compared to the total area of the buffer zone
Degree of urbanisation	Number of residents within the buffer zone, compared to the total area of the buffer zone
Safety	
Speed limit at school entrance	30 km/h speed limit at school entrance (within 100 m by road from the school)
Average maximum traffic speed limit	Average maximum speed limit of roads within the school buffer zone. Roads with walking speed limit were assigned speed of 7 km/h
Speed limiting measures	Density of speedbumps within the buffer zone, compared to the total area of the buffer zone. Presence of signage announcing school zone
Preferred road type	Length of roads of preferred functional class within the buffer zone, compared to the total length of the road network
Environment	
Slope	Slope of school access roads (average slope within 100 m service area). Average slope of roads within school buffer area
Nature	Density of green areas within the school buffer zone

Based on the reviewed academic literature, Nordic research considers communication and cycling awareness campaigns, mainly in relation to safety, especially safety for children. There is some discrepancy between the role of campaigns versus policy/legislative actions for influencing transport behaviour. Many studies emphasise mixed methods approaches for collecting data on cycling, with some also testing new technologies to gather quantitative as well as qualitative insights. While some studies have looked at perceptions of cyclists, no specific research was found that considered drivers' perspectives in relation to cyclists in the Nordic countries, or campaigns communicating awareness about cyclists targeted towards drivers.

Data, communication, and advocacy in Nordic cycling strategies

Signs like this one in Copenhagen make the data collection process transparent, inviting cyclists and other city-dwellers to see the measures themselves.
Source: James Cridland / Flickr

Data, communication, and political advocacy are crucial parts in developing cycling infrastructure, influencing behaviour, and increasing knowledge among cyclists as well as local and regional authorities. Based on a review of local and regional strategies from Nordic municipalities and regions participating in the Nordic Cycle Network[3], these topics are well-integrated into authorities' everyday work. Nevertheless, while there are numerous similarities, some differences and unique practices are present. Most notably, data and communication are primarily addressed on the local level, while regional authorities focus on other aspects, such as development of the broader regional infrastructure. The following sections examine these similarities and differences as described in the most recent Nordic local and regional strategies. However, in practice, cities are likely implementing a broader range of approaches than those explicitly described in the strategic documents.

Cycling data collection in municipalities

Most of the municipalities have specific data gathering procedures and collect similar data related to cycling. The most common indicators that municipalities observe are trends in cycling in different areas; time of day, week, or year of cycling; demographic distribution and socio-economic status of cyclists; type of bike used (conventional, electric or cargo bike); the purpose of travelling (to work, school, shopping, etc.); designated parking spaces near homes; and overall satisfaction of the city's efforts to make cycling more accessible and convenient (Aarhus kommune, 2017; Bergen kommune, 2020; City of Copenhagen, 2011; City of Helsinki Urban Environment, 2020; City of Reykjavík, 2021; City

3. Cities and regions involved in the network and in this report include Aarhus, Copenhagen, Roskilde, Capital Region, and Region Midtjylland (Denmark); Helsinki, Tampere, Helsinki Region (Finland); Reykjavik, Capital Region (Iceland); Bergen, Oslo (Norway); Gothenburg, Helsingborg, Malmö, Örebro, Stockholm, Region Stockholm, Region Skåne (Sweden).

Planning Helsingborg Committee, 2017; Gothenburg Traffic Office, 2015; Oslo kommune, 2015; Stockholms stad, 2022; City of Tampere, 2022). This data is oftentimes compared to other modes of travel, e.g. car or public transport. Some municipalities also compare the costs of such travel, highlighting the cost-effectiveness of choosing the bicycle.

Local and regional authorities use various methods for collecting data, the most popular being automatic counters, placed strategically around key cycling paths. For instance, Copenhagen has a monitoring device on the Bryggebroen Bridge, Stockholm has one on Skanstullsbron bridge, and Helsingborg on Hävertgatan (City of Copenhagen, 2011; City Planning Helsingborg Committee, 2017; Stockholms stad, 2022). These automatic devices track cycling traffic flows and provide valuable data about cycling trends. Usually, the automatized counters are supplemented by randomised manual counting, which also includes tracking the types of bikes that pass by (Gothenburg Traffic Office, 2015). Municipalities tend to collect and/or synthesise data annually or every two years, after which changes are tracked to highlight the impact of, e.g., infrastructure modifications, or to make a compelling case for investing in future initiatives (Bergen kommune, 2020; Roskilde kommune, 2017).

Surveys are also a frequently used method for gathering cycling-related figures. Aarhus, for instance, has conducted surveys inquiring about the habits of wearing helmets when cycling (51% of cyclist self-report to have worn a helmet during their last cycling trip) or having specialised lights on bicycles during dark hours (90% of cyclists self-reported to have lights on bicycles during their last trip in the dark; Aarhus kommune, 2017). Another example of surveys comes from Stockholm, where according to different surveys, 60-70% of residents have access to a well-functioning bicycle. The latest citizen survey shows that of those who own a bicycle, 65% report using them at least 1-2 times per week (Stockholms stad, 2022). Bergen carried out a survey where a representative group of residents provided answers on their cycling habits and expectations about cycling infrastructure and safety. For younger respondents, questions were also given about children's habits for cycling (Bergen kommune, 2020).

Sense of security and numbers of accidents are monitored extensively across the municipalities as well. In Swedish municipalities, data on accidents are primarily collected through the Swedish Transport Agency's reporting database for traffic accidents, called Strada (Swedish Traffic Accident Data Acquisition; City Planning Helsingborg Committee, 2017; Gothenburg Traffic Office, 2015; Stockholms stad, 2022). The database gathers information from both police report traffic accidents as well as emergency hospital reports. Local polls on safety are also conducted to a significant extent, aiming to regularly measure the perceived safety and related issues when cycling (City of Copenhagen, 2011; Oslo kommune, 2015; City of Tampere, 2022). Gathering data both on accidents and perceived safety can provide valuable data on the relationship between objective risk factors and individuals' subjective sense of security.

Oslo municipality has a particularly intricate system of gathering and storing cycling-related data. To reduce conflicts between different sustainable transport modes, improve access to data for city planners, and better control data quality, the city developed a geodatabase for green transport, including cycling. It stores data about bicycle

infrastructure, projects, winter maintenance priorities, and other important initiatives. The municipality also uses 3D camera and AI technologies to evaluate infrastructure projects by identifying road users' movement patterns to highlight their interactions and conflict points (Jorun Andenes, 2023).

Communication actions and strategies

Nordic municipalities devote considerable attention to communicative measures aimed at promoting cycling and increasing its popularity among residents. Most municipalities run various types of campaigns directed to the public or a specific target group. These campaigns are usually complemented by events, conferences, or other fora and methods that form dialogue between authorities and the cyclists. Key communication efforts identified within the policy review include branding of the city as a cycling city, educating young people and newcomers about cycling, providing cycling maps for cyclists, as well as other campaigns to improve the cycling experience.

There are different approaches to marketing and engraining cycling into the identity of the city. For instance, Aarhus has developed an Aarhus cycling city brand[4] (*Aarhus cykelby*) aiming to make cycling more popular. The brand seeks to be visible in schools and kindergartens to introduce cycling to young people, and to newcomers to the city to present cycling as an integral part of the Danish identity and to allow visitors to experience Aarhus from a local's perspective. In addition, Aarhus used to have a temporary Cycling Library (*cykelbibliotek*), where residents could borrow special types of bicycles and receive guidance on how to properly and safely prepare their bikes for use. The municipality also supports short-term bicycle renting services for tourists. They aim to make bicycle facilities more visible to the public, thereby strengthening the visibility of the Aarhus cykelby brand (Aarhus kommune, 2017). These initiatives were incorporated into a prioritization plan outlining the city's key actions and communication strategies (see Box 1). For instance, there are detailed interactive maps of Denmark, where regional[5] and national[6] cycling routes, among other things, are laid out for cyclists to plan their route (ruter.dk, n.d.; udinaturen.dk, n.d.).

4. See more at https://aarhus.dk/cykling
5. See more at https://udinaturen.dk/kort
6. See more at https://ruter.dk/routetype/nationale-cykelruter

BOX 1. AARHUS MUNICIPALITY'S COMMUNICATION INITIATIVES PRIORITISATION LIST (SOURCE: AARHUS KOMMUNE, 2017)

1. Preparation of bicycle maps
2. Preparation of information material about *Aarhus cykelby* in several languages
3. Campaigns aimed at improving traffic behaviour
4. Behavioural projects focusing on testing and gathering knowledge about drivers and barriers in connection with cycling
5. Campaigns to promote cycling ad cycling culture among children
6. Campaigns to promote cycling among citizen groups who cycle less than others (health equality)
7. Loaning out special bicycles via the Bicycle Library
8. Promoting cycling as an attractive form of transport for everyone (e.g. promoting electric bicycles)
9. Preparation of a design manual for Aarhus Cycling City

Some municipalities also participate in national campaigns, such as Roskilde's "We are biking to work" (*Vi cykler til arbejde*).[7] They also offer cycling courses for migrants who may not have experience with cycling (Roskilde kommune, 2017). In Bergen, similar learning initiatives are offered for children to educate, train, and encourage them to cycle more actively. Additionally, the city aims to strengthen communication channels between citizens and the public sector, fostering dialogue on cycling by sharing information about ongoing and future cycling projects (Bergen kommune, 2020). For example, in Helsingborg, such dialogue is fostered through an app called "A better Helsingborg" (*Ett bättre Helsingborg*) where people can leave messages to the municipality (City Planning Helsingborg Committee, 2017).

To organise the municipality's cycling-related actions systematically, Helsinki has also developed certain measures categorized into five themes. One of the themes is dedicated to marketing and communications where plans for developing bicycle traffic monitoring operations, updating the marketing strategy, developing and implementing the communication plan, and updating the cycling map are laid out (City of Helsinki Urban Environment, 2020).

An effective communication strategy is essential for attracting more cyclists, and Gothenburg municipality considers communication as a key part in making the city an attractive city in which to cycle, alongside factors like infrastructure and maintenance. The city's communication strategy emphasises image communication, product communication, behavioural communication and communication at construction sites

7. See more at: https://www.vcta.dk/

(Gothenburg Traffic Office, 2015). Activities and campaigns usually cross several communicative domains. Image communication seeks to carry over the message that cycling is an inherent part of the city which Gothenburg prioritizes. Some examples include cycling race events or cycling conferences. Product communication refers to the need to have high-quality infrastructure, maintenance, support, and services, which need to be clearly presented to inhabitants, so they are aware of what the city is doing to make cycling more attractive. For instance, a public vote was held on the lighting system and the introduction of a cycling prioritization measure, both of which generated significant media attention. Behavioural communication aims to have more people cycling. Since the municipality does not have a direct contact with cyclists, these initiatives are carried out through cooperation with schools, universities, and workplaces. Some examples include a traffic educator that works with schools and a bicycle-friendly workplace initiative directed at interested employers. Communication at construction sites seeks to inform cyclists of ongoing and planned construction that might affect their daily cycling routes. It also aims to inform cyclists about why the specific construction work is carried out to support transparency and trust-building (Gothenburg Traffic Office, 2015).

Noteworthy practices

Winter cycling in the Kruununhaka district. Helsinki uses a detailed monitoring infographic to track infrastructure measures and cycling data, including intensified winter maintenance.
Source: Juha Valkeajoki, Sherpa / The City of Helsinki

Applying data in practice: The example of Helsinki municipality

Nordic municipalities generally make use of data to inform their strategies and strengthen their cycling initiatives, as outlined in the policy review above. However, the planned development of increased cycling in Helsinki is a noteworthy example showing how data can support municipal initiatives. Helsinki's approach is highly data-driven, with data-related activities integrated throughout the entire process, including the development of a database for the cycling route network, collecting and refining data on the conditions of cycling routes, collecting basic data for construction sites in a single database, and compiling a situational database of bike racks (City of Helsinki Urban Environment, 2020).

The data is used for the municipality's political advocacy to justify infrastructure investments and present concrete impact. Conducting counts on number of cyclists at locations both before and after renewing the infrastructure serves as an important benchmark for the municipal administration and political leadership. For instance, even if the overall modal share of cyclists does not reveal a significant increase, the city has observed and collected actual cycling volumes at improved locations, which provides strong evidence to continue investing in cycling.

Helsinki has developed a detailed monitoring infographic, highlighting relevant cycling data alongside promotional measures to strengthen cycling habits in the city (Figure 1). Similar tracking is also conducted in other municipalities; however, this example successfully illustrates and summarises the initiatives and their tracking methods. The infographic highlights information including, for example, human resources for promoting bicycle traffic (in Helsinki, this increased by two people between 2017 and 2019), the amount of new bicycle parking spots built per year, and length of the bicycle network, among other points. While Helsinki's way of gathering data is not particularly unique compared to other large Nordic municipalities, their key performance indicators stem from manual counting as well as automated bicycle counters, induction loops at signalised intersections, a biannual bicycle barometer study (phone interviews), citizen feedback, and more. Helsinki is also collaborating with EcoCounter to collect data from automated counters, along with other smaller operators, and with Forum Virium Helsinki (an innovation company owned by the municipality) for data collection and analysis.

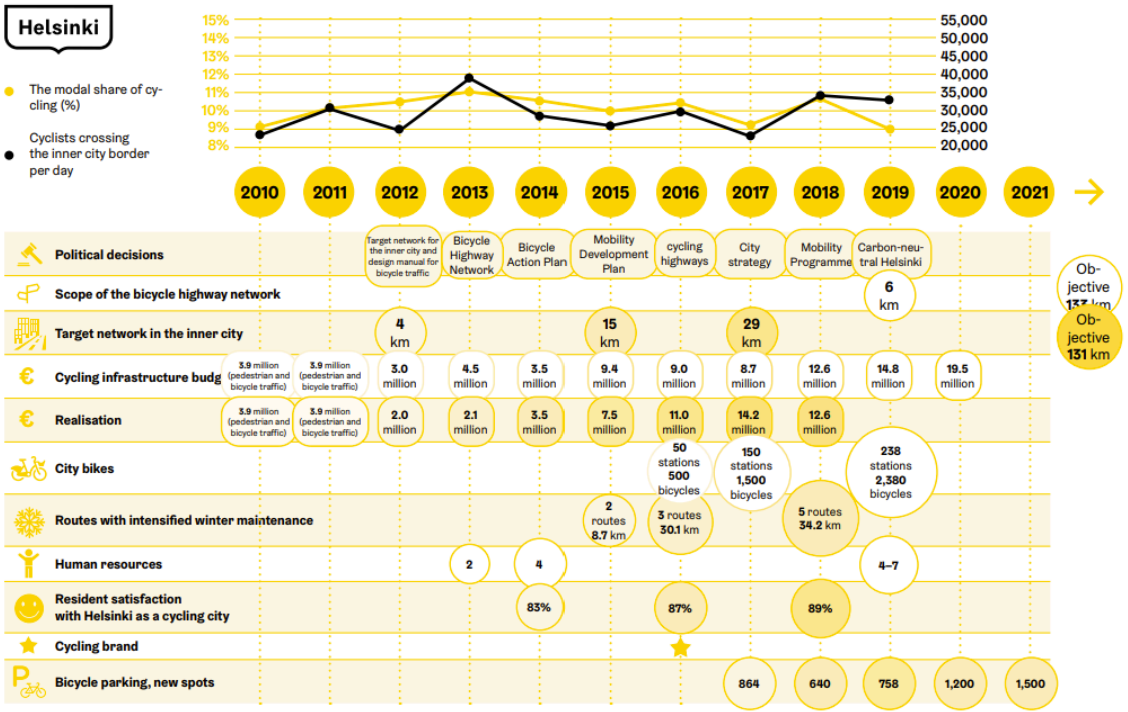

Figure 1. The figures for bicycle traffic in Helsinki and key promotion measures since 2010. (Source: City of Helsinki Urban Environment, 2020)

Regarding its internal organisational structure, the city conducted assessments of organisational awareness related to cycling measures and their own action plan. Such data collection provides additional knowledge on improving efficiency and managerial success. A survey sent out to different units and divisions revealed some points that pose challenges to the implementation of the city's cycling strategy. For instance, one department observed that several units were not responsible for the measures assigned to them in the action plan, contrary to the initial intention, highlighting an organisational misunderstanding. Another department thought that the main challenge was the lack of human resources for successful implementation of the plan. A comparison with other European capitals was also carried out to examine the resources allocated to municipal cycling initiatives (Figure 2). By comparing itself to other successful municipalities, Helsinki can identify areas for improvement and future focus areas.

City	Population	Human resources	Investments MEUR	Investments as EUR per resident	Modal share of cycling (commuting, trips to educational institutions)	Note!
Helsinki	650,000	3–7	7–20	11–22	14%	Additionally, there are several people in Traffic and Street Planning who promote bicycle traffic as part of their other duties.
Copenhagen	620,000	20	11–27	18–45	49%	Other employees that promote cycling have also been integrated elsewhere in the organisation
Amsterdam	870,000	18	58	67	36%	The proportion of all modes of transport includes all trips. The investments do not include project targets, new areas and bicycle parking centres
Munich	1,530,000	18	11	7	18%	
Stockholm	960,000	15–20	19–26	20–27	15%	

Figure 2. Human resources and investments in promoting bicycle traffic. (Source: City of Helsinki Urban Environment, 2020)

Additionally, some of the collected data is applied for self-evaluation and achievement tracking. Helsinki has determined a goal in its strategy to increase the modal share of cycling to 20% by 2030[8] with five sub-goals to help achieve the main goal: (1) cyclists have direct and efficient routes with clear junction arrangements, and bicycle and pedestrian traffic have been separated from each other well, (2) the cycling routes and parking areas are maintained to a high quality all year round, (3) cycling has been taken into account in arrangements around construction sites, (4) the amount of bicycle parking spaces and services meets the demand and they are of high quality, and, (5) marketing and communications promote a positive image of bicycle traffic. These sub-goals are monitored by detailed performance and effectivity indicators that highlight the current state as well as foreseen objectives. In addition, each sub-goal is described in more detail under the performance indicators, with corresponding criteria outlined under the effectiveness indicators.

The new Helsinki Bicycle Programme 2026-2030

A systematic and detailed processes for data collection and application have allowed Helsinki to further develop a new bicycle programme for the years 2026-2030, which builds on the ambitious goals set in the previous strategic document. While developing the new programme, every division in the municipality was involved. In addition, the scope was broadened from solely infrastructure to people who will use the infrastructure. Infrastructure development will be treated as a key foundation for mobility management, while efforts to establish a dedicated cycling network will be accelerated.

8. The Helsinki Bicycle Action Plan indicates a cycling modal share goal of 20% by 2035; however, since the publication of the plan in 2020, the target year has been accelerated to 2030. This is in line with the city's 2030 carbon neutrality goal, since cycling has been identified as an essential measure for reaching carbon neutrality.

Helsinki aims to continue its structured work by developing a set of measures under the two main themes—"People" and "Infrastructure"—along with related sub-themes. A responsible party has been identified through multilateral collaboration, achieving preliminary commitment across divisions. At the time of writing, the City of Helsinki is finalising their new Helsinki Bicycle Programme 2026-2030, with plans to publish it in spring 2026.

Ongoing challenges

Managing available data and collecting the right data within limited budgets remain key challenges. Oslo has addressed this with a geodatabase for green transport and cycling that improves data access, quality and coordination between modes.
Source: Marek Lumi / unsplash.com

As noted in the introduction, this planning memo synthesizes findings gathered from desk research as well as discussions among Nordic cycling practitioners. During the workshop, the practitioners described several ongoing challenges related to collecting and using data, including the usual suspects of lack of budgeting and obstacles for smooth coordination. However, the practitioners also noted things like time constraints and lack of capacity for analysing the data collected or making use of it in the most effective ways. Planners in Nordic countries already collect a substantial amount (and multiple kinds) of cycling data—ranging from cyclists' demographics, travel purpose, perceptions of cycling design and safety, number of bicycle parking spaces, accident data, types of bicycles used, and infrastructure data (like length of the network and status of the pathways). However, sorting and making use of it remains a planning as well as a human resources challenge, and planners face difficulties with prioritising between which data is necessary versus "nice to have".

While cycling data is collected through a wide range of methods such as trackers, manual counting, police records, national or regional surveys, observations, and ethnographic interviews, some methodologies for data collection can pose a challenge both with regards to technical constraints (e.g., tracker malfunctions or ill-placement) and with procuring new counting methods that accurately collect the data required.

At least one Nordic practitioner also noted some limitations with regards to aggregated data at the city level, when mobility patterns need to be assessed at a more detailed level to represent, for example, specific city districts. There are also remaining challenges with regards to merging data sources so that comparisons can be made across regions.

When it comes to communication around cycling and cycling projects, planners often face some form of "bikelash" among politicians or the community. In Helsinki, media reports after infrastructure projects highlighted that few people were using new cycle paths and that modal share at the city level had not increased after improvements had been made. However, the city did measure and find significant increases in the number of cyclists that used the upgraded cycle routes, even if the increase was not reflected in the city-wide modal share numbers. Furthermore, the planners discussed the importance of taking

stock after more time has passed. One example of this outside of the Nordics comes from several Australian researchers who studied community perceptions of a cycling path in Sydney ten years after it was implemented. While perceptions at the time of changing the street seemed extremely critical, Harris and colleagues (2025) conducted a survey and interviews showing that the majority (more than 80%) of both car owners and cyclists viewed the cycleway positively ten years later (Harris et al., 2025). Transformation is not always immediate, but the infrastructure is a major step in the process of increasing cycling, and it has to be in place before expecting longer-term changes in mobility patterns. Once the investments to improve cycling have been made, then the city can focus on campaigns and attracting more people to utilise the infrastructure.

Cities and regions also reported that negative voices are often the loudest ones, and this loud minority is what media frequently highlights. However, the quiet majority often support cycling efforts, and communicating the benefit of cycling infrastructure to all residents can have an impact. The Nordic practitioners note that it is important not to become too distracted by the noise. However, making convincing arguments about the wider benefits of cycling for the whole of the city's or region's residents continues to be an obstacle.

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Lisa Rohrer & Jonas Kačkus Tybjerg

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Nordregio
Holmamiralens Väg 10
Skeppsholmen
Stockholm, Sweden
www.nordregio.org