ODIN

OPEN MOBILTY DATA IN THE NORDICS

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A Nordic Approach to Smart Mobility

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Smart mobility

Transportation is a critical component for achieving our goals for a sustainable future. Current ambitions on the national, European and Nordic levels will require a redefinition of how we move around.

Three strong trends are currently driving transportation development: automatisation, servitisation and electrification, and these trends will fundamentally shift the way we consume mobility in the future. They will also redefine the role of traditional public transport and require innovative ways to combine public transportation with new mobility services and offerings.

The future mobility landscape will consist of new actors and contributors who, in many cases, will act on an international scale. New ecosystems are being shaped, and collaborations based on data and digital interweaving. As the industry of mobility is being disrupted, we need to align traditional public transport with these new contexts and make it a part of future mobility.

"Mobility can now be seen as an information service with physical transportation products, rather than a transportation product with additional services."

(The Role of Regulation in preparing Transport for the Future: Study for the European Parliament, 2016)

The need for a Nordic approach

Actors in these emerging ecosystems of smart mobility solutions act on a global level. The future of mobility is thus defined in the context of large userbases and regions that can offer relevant digital cooperation concerning, for example, open data and services.

In this regard, the Nordics remain fragmented. Given our track record in the field of traditional public transport and digitalisation, however, we believe now is the time to transform those strengths into a comprehensive and bold Nordic offer. With relevant data offerings and new possibilities for cooperation, we will shape the Nordics into an attractive and leading region for future mobility services.
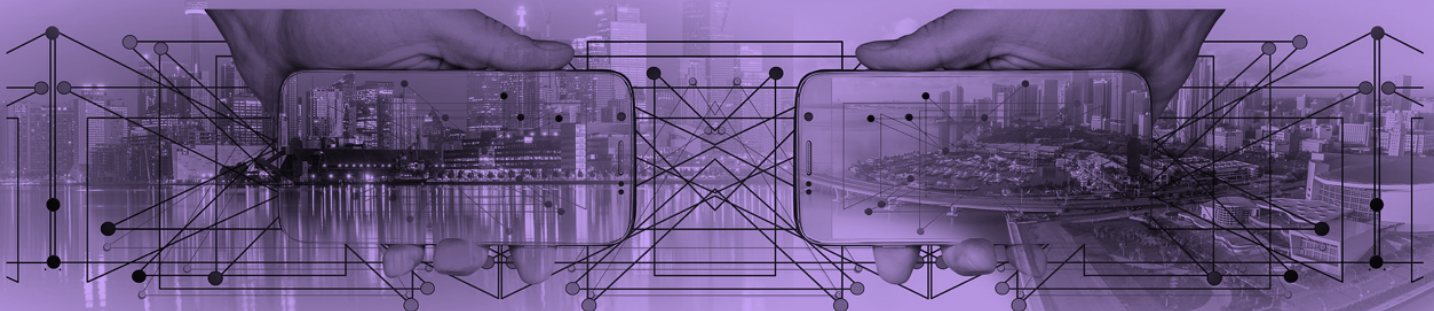
A Nordic approach to smart mobility

Public transport is a key element in the conundrum of mobility services in the Nordics. However, by leveraging new digital solutions and connecting to innovative mobility services we can further increase the market share for sustainable mobility. For this to happen in the Nordics, we need a solid base of open high-quality data that can expedite cooperation with new actors, creating innovative offerings for mobility.

Creating opportunities for innovation in the Nordics

We want to lower the barriers for entering the Nordic market and expedite the process of launching mobility services to residents in the Nordics. In this way, we aim to enable the Nordics as a living lab for new innovative mobility services.

A critical step in lowering current barriers is to simplify the onboarding process to open Nordic mobility data. We believe that harmonised data delivery throughout the Nordics will increase the deployment of services to the Nordic userbase and lay the groundwork for an attractive market.

Working together in the Nordics

To accelerate mobility innovation, the EU is currently implementing new regulations to expedite and harmonise available mobility data. In the Nordics, we welcome these regulations. We aim to use them as a driver in our work towards a first-class innovator experience in the mobility area. Also, by working together, the Nordic countries can articulate a firm joint voice in policy development at the European level.

Delegated Regulation 2017/1926

- EU Regulation 2017/1926 prescribes that EU members must publish 48 mobility data categories.
- The regulation applies to the whole transport network, all modes of transport, and both private and public actors.
- Static data must be published if stored in a digital format. Dynamic data should be published.

Apart from harmonisation of data and joint policy work, we see substantial benefits from sharing technical solutions, avoiding unnecessary duplication of work and re-using best practices. In the years to come, we will strengthen our Nordic partnership on these topics.
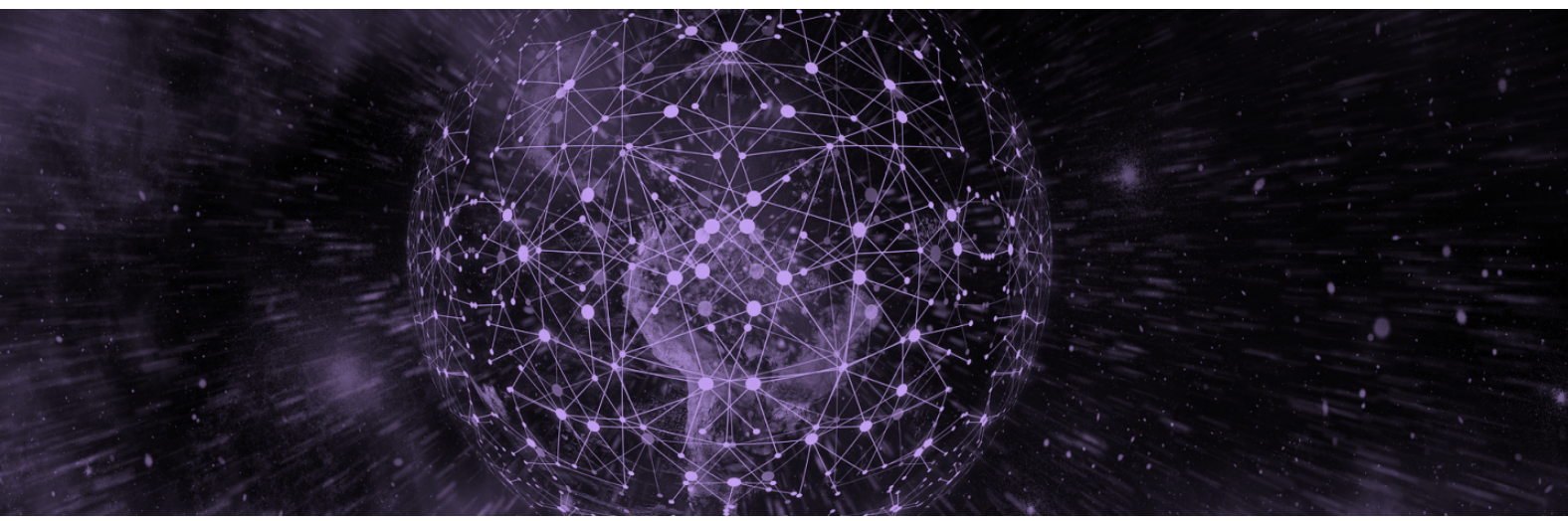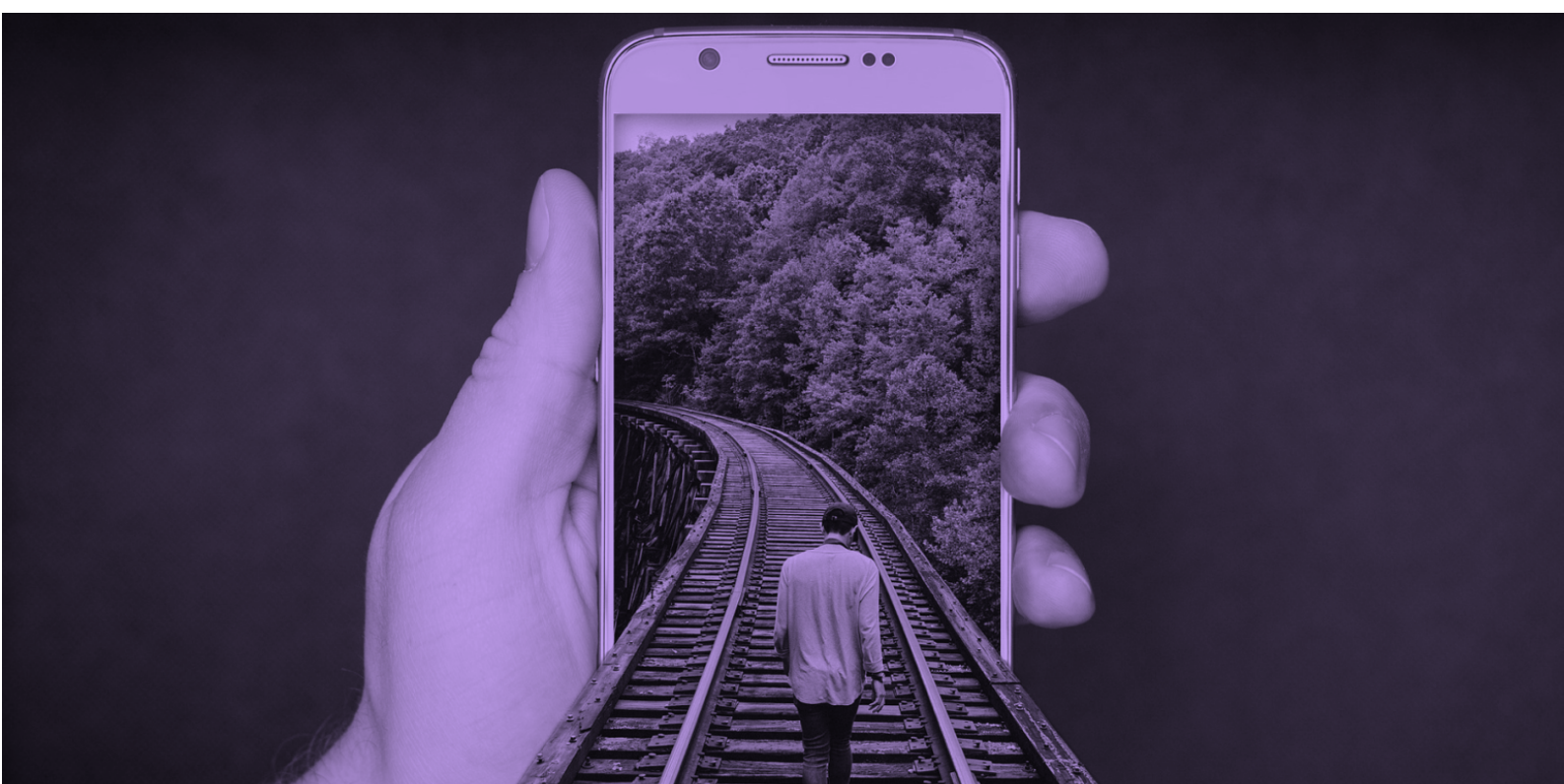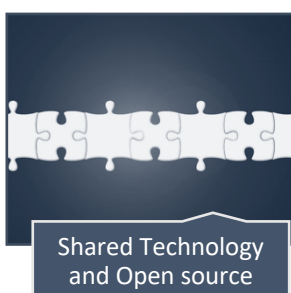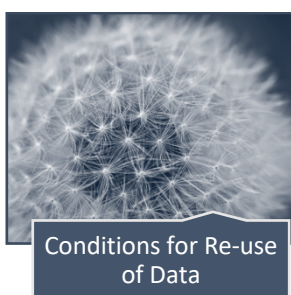
Focus areas for cooperation

In this paper, we signal our joint ambitions to actors involved in the creation of smart mobility services. We do so by highlighting six prioritised areas for strengthened cooperation within the Nordics. In terms of establishing a digital infrastructure, we argue that these areas are the ones most relevant to create a vibrant Nordic ecosystem in the field of future mobility. By tackling these areas, we have the opportunity to establish a world-leading region in smart mobility.

The focus areas support the Nordic approach to smart mobility by creating opportunities for cooperation, pushing openness and thereby enabling the Nordics as a living lab for new innovative mobility services.

In each area, we describe the desired position for the Nordics, current challenges and necessary actions to reach the desired position. We will start to address these necessary actions in the joint project *Open Mobility Data in the Nordics* (ODIN).

Datasets and services

Conditions for Re-use of Data

Standards and Formats

Leveraging EU-regulations

Shared Technology and Open source

Outrech and Developer Experience

Datasets and Services

We need a common baseline of datasets and services, as it provides the foundation to establish the Nordics as a market for innovative services.

Externally driven harmonisation efforts like GTFS exports and upcoming EU regulations have so far been instrumental in opening up mobility data in the Nordics. However, in order to establish the Nordics as a living lab for new, innovative mobility services, we need to take additional steps. These steps include common definitions of key concepts, language issues and aggregation of data feeds.

Desired position for the Nordics

- The following datasets, based on common definitions, should be available in all Nordic countries
    - Stops and stations
    - Routes and schedules
    - Travel planning services
    - Fare information and rules
    - Ticket sales services
    - Real-time data.
- We need data to be language-independent
- We want aggregated data feeds per country to minimise administrative work for third-party developers.
- We require open data and services that allow for services to roam throughout the Nordics.

Current challenges

- There is a lack of structure for cross-border data, constraining services operating across Nordic borders.
- Data is language-dependent, e.g. disturbance information is only given in the local language.
- There are different definitions of key public transport constructs across the Nordics.
- The Nordic countries have differing preconditions to support several standards
    - Sweden, Denmark, and Norway have national data aggregation points for public transport actors
    - Finland is currently lacking such an aggregation point.

Necessary actions

1. In-depth analysis of
    - inconsistencies regarding existing data and services
    - cross-border issues across the Nordics
    - language dependencies in data delivery.
2. Create an action plan to harmonise data and services.
3. Establish a Nordic Open Data Barometer.

Conditions for Re-use of Data

We need common licences for the re-use of data and harmonised terms for access to data, and to start the work towards harmonised terms for ticket sales.

This is necessary since the use conditions will define the scope for what innovation is allowed for innovators. Through permissive and harmonised licences and terms, we will create sufficient room for innovation throughout the Nordics and minimise the legislative burden for innovators.

Desired position for the Nordics

- Three different distinct terms and licences are available across the Nordics: data licence, access terms and, ticket sales terms.
- Data should be offered using a standard international licence allowing maximum re-use. We argue that CC0 should be such a licence.
- Terms for access should be harmonised so that services can be deployed across the Nordics. This means that innovators should expect e.g. to be offered a similar number of API calls across the Nordics.
- Terms for ticket sales is a promising but still emerging area subject to national constraints. However, the contents of such terms should be discussed, and knowledge of good and bad experiences should be shared.
- Established standards and practices for how to handle privacy concerns when opening up data.

Current challenges

- National legislation prescribing publication of data under other licences.
- Terms for access are dependent on the respective country's underlying IT architecture.
- Terms for ticket sales must meet a number of unresolved challenges. For instance, who is allowed to sell tickets, what profit margin/kick-back will be paid to resellers, and what price can be offered to the traveller?
- Lack of legislation prescribing under what licence private actors must publish data.
- Privacy concerns when opening up data

Necessary actions

1. Implement CC0 licences for datasets when possible.
2. Identify and harmonise the most important common terms related to the provision of real-time data and services, constraining development of cross-Nordic services. If possible, such terms should be compliant with applicable standards, be machine-readable and aligned with the open API definition from OKFN.
3. Identify the most important common terms related to the provision of ticket sales for cross-Nordic services.
4. Visualise and communicate the current Nordic landscape of licences.
5. Monitor, contribute and collaborate with established regarding privacy concerns, such MyData.

Standards and Formats

We need commonly agreed standards and formats to publish data and services consistently across the Nordics.

This is important since standards serve as a powerful tool to unlock mobility ecosystems around the globe. Standards are needed for scheduled and real-time data, travel planning, demand-responsive traffic and, in the near future, ticket sales services.

Desired Position

- NeTEx data should be published based on a common Nordic profile. In addition, we should work towards having NeTEx as a standard for data exchange within the industry.
- Harmonised deliveries of GTFS, SIRI (including SIRI-lite) and GTFS-RT.
- Emerging standards (such as Linked Open Data) should be continually monitored and assessed.
- DCAT-AP should be used as a standard for metadata at national access points.
- Open Journey Planner should be used as an interface standard for travel planning services.
- Standardising ticket sales services is a promising but still emerging area. In the short term, the Nordics should share knowledge in the area. The longer-term goal is to harmonise services for ticket-sales across the Nordics (if public transport actors allow ticket by sales by third parties).
- A standardised interface to demand-responsive traffic should be adopted across the Nordics.

Current challenges

- Public transport actors are currently invested in different standards across the Nordics
  - Norway has already made the switch to NeTEx
  - Most actors in Sweden use NOPTIS
  - Denmark uses a format from software vendor HaCon
  - Finland uses GTFS.
- All countries publish GTFS files with different content and interpretation of the standards.
- Currently, there is a lack of consensus around metadata standards.

Necessary actions

1. Joint interpretation, design, and implementation of a Nordic NeTEx profile.
2. Joint interpretation, design, and implementation of GTFS exports.
3. Define the role of SIRI and GTFS-RT in the cross-Nordic mobility landscape.
4. Use OTP to implement the OJP standard for the Nordics.
5. Use DCAT-AP as a standard for metadata at national access points.

Leveraging EU Regulations

We need to implement EU Regulation 2017/1926 in a way that increases the attractiveness of the Nordic mobility market.

The European Commission has gone to great lengths to harmonise European mobility data. Starting in December 2019, member states must establish national access points for open travel and traffic data. In addition, all member states must publish designated mobility data categories in prescribed formats to support the provision of EU-wide multimodal travel information services. We seek to leverage these far-reaching regulations to increase the attractiveness of the Nordic mobility market.

Desired position for the Nordics

- The Nordic approach is compatible with the EU regulation and has opened up the Nordics as a market for smart mobility services.
- The Nordic countries have a shared understanding and interpretation of regulated data categories.
- We should share knowledge on the design and use of national access points.
- The Nordics are synchronised on future policy issues and, where applicable, have a unified voice in such work.
- Data released under NeTEx and SIRI will be done so under a common profile.

Current challenges

- Limited awareness of the EU regulation and the work to be done in the transportation industry.
- Difficulties for the Nordic countries to individually push policies on an EU level.
- 28 nations implement the same in 28 different ways.
- Deciding on precise usage of NeTEx and SIRI.

Necessary actions

1. Design and implement a common Nordic profile towards a European profile.
2. Together with other initiatives, address the treatment of datasets beyond the scheduled transport modes (bike sharing, car sharing and other demand-responsive modes).
3. A common interpretation of the regulation and common decisions on ambition level for dynamic data.
4. Make contributions to responsible authorities around rationales, design alternatives and ways to cooperate for national access points.
5. Contribute to a unified Nordic position and voice in the development of upcoming EU regulations and standardisation.

Shared Technology and Open Source

We need a higher degree of agility, a faster time to market and opportunities to co-create with external actors.

In this we strongly believe in open source as a way of working with digital solutions in our industry. Open source creates fewer dependencies to commercial software houses and allows for market-responsive development. The transparency of source code also drives more secure solutions and fosters a culture of reciprocity through shared risk and work effort.

Desired position for the Nordics

- Open source solutions are used across public transport actors in the Nordics where development plans for common components are shared. Examples of such solutions are the Norwegian National Stop Registry, Chouette, OpenTripPlanner and CKAN.
- Rich sharing of competence in the field of open source. Such competence sharing would include how to organise open source work, development practices and licensing.
- Working actively together with the OpenStreetMap community to encourage the use of open mobility data in OpenStreetMap and to identify errors in our data. In addition, OpenStreetMap is used as source for geodata.
- Cooperate through open source in developing future solutions (e.g. Open Ticketing API standards).

Current challenges

- A cultural shift is needed in our organisations, from procurement towards co-creation with open source communities. Working with open source is not a turn-key solution.
- Lack of acceptance and lack of experience of the open source governance model in the Nordic public sector.
- Lack of knowledge about open source, open source business models and risks with open source.

Necessary actions

1. Communicate good examples that are using open source, both experimental pilots and business-critical solutions.
2. Create forums for leaders to connect and share experiences from open source.
3. Establish OpenTripPlanner as a Nordic framework for journey planning services.
4. Make Nordic stop registries available and ensure use in OpenStreetMap. Use OpenStreetMap as a source for geodata.
5. Strengthen relations with external organisations advocating open source, both in general and within our industry.

Outreach and Developer Experience

We need to understand re-users' needs as well as have fruitful developer relations to build a vibrant Nordic ecosystem of mobility services.

This depends on our capability to facilitate the work practices of external developers and to build reciprocal relationships. Creating an excellent developer experience and a communicative outreach programme is therefore key to our open data investments.

Desired position for the Nordics

- Scaling from one Nordic country to the entire Nordics is seamless for third-party developers.
- Third-party developers with an interest in cross-Nordic service development should be able to get an overview of what data that is available in each country, the quality of such data, and the actor who is making it available.
- Published examples, libraries and other support tools, enabling cross-Nordic service development, should be available.
- Best practices regarding developer onboarding and scalable support functions are shared among the Nordic countries.
- Best practices regarding university engagements and collaboration with other authorities are shared among the Nordic countries.

Current challenges

- Third-party developers cannot plug-and-play services across the Nordics.
- Current support functions do not allow for scaling in a resource-efficient way.
- No coherent overview is available for open mobility data in the Nordics.
- There are no tools easing development of mobility services for the Nordics as a region.

Necessary actions

1. Collect developers' experiences from working on a Nordic level in order to develop our offering.
2. Analysis, design, and development of necessary support tools and publication of existing ones (e.g. Entur's Nordic Journey planner).
3. Give prospective developers an overview of Nordic Open Mobility Data and means of online collaboration.
4. Organise an innovation contest to boost Nordic mobility service development.
5. Collect and share best practices for developer onboarding, documentation, and scalable support functions.
6. Collect and share among the Nordic countries' best practices for university engagements and collaboration with other authorities.

From vision to action

The new landscape of actors and disruptive offerings within the area of smart mobility creates apt opportunities to tackle current challenges in the transport sector.

In this setting, the Nordic countries can strive to become the leading region for future mobility services. Thus, this paper has highlighted six prioritised areas regarding open mobility data that need to be addressed to reach this position.

The ODIN project

The *Open Mobility Data in the Nordics* (ODIN) project will shape a framework for Nordic cooperation in those areas. During 2019–2021 it will nudge the development of the Nordics into a living lab for future mobility services through open mobility data and data-driven collaboration.

The project is a collaboration between Nordic actors within the public transport industry.

Open Mobility Data in the Nordics (ODIN)

- The project aims to accelerate and coordinate the work necessary to create a unified market within the mobility sector in the Nordics.
- The project is a joint venture between Entur, the Swedish Transport Administration, Samtrafiken, Helsinki Region Transport, and the Finnish Transport Administration.
- The project is coordinated by RISE ICT Viktoria (Research Institutes of Sweden).
- In addition, the independent management consultant firm SFMCON is a contributor to the project.
- The project is funded for 2018–2021 by the Swedish Transport Authority and the Swedish Innovation Agency.

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www.nordicopenmobilitydata.eu