Fintraffic

Impact Potential of the Traffic Data Ecosystem

Report - June 2023

FLOU Ltd

Contents

Executive summary – Overview (1/3)

Traffic data economy in Finland, 2022*

230 M€

Direct business impacts

90-651 M€

Wider societal benefits

The overall traffic data economy in Finland is estimated* to be 300-900 MEUR in 2022 and 600-1400 MEUR in 2030.

The overall impact potential is challenging to gauge, the wider societal benefits are likely somewhere in-between the range presented

Fintraffic's Traffic Data Ecosystem is part of the overall traffic data economy

Services convert data provided by Fintraffic into impact, such as

- Traffic information services (e.g. Waze, Radio Nova)
- Multimodal journey planners (e.g. HSL, Waltti)
- Navigation services (e.g. Waze, Google Maps)
- Services for logistics (e.g. PortActivity)

Main impacts from current use of Fintraffic's data are:

- Travel time savings from real-time traffic information and better road network efficiency
- Travel time savings and increased attractiveness in public transport
- Enabling Just-In-Time operations better efficiency in logistics
- Better safety, transport system planning and maintenance

Impact awarded to Fintraffic is estimated to be in the range of

10 M€

Direct business impacts

4-26 M€

Wider societal benefits

A share of the data economy (both business impacts and wider societal benefits) can be awarded to Fintraffic on its active role in promoting the ecosystem, use of data and providing open data, in addition to providing data-based services.
Impact awarded to Fintraffic is estimated to be in the range of 10-40 MEUR in 2022 and 20-60 MEUR in 2030. The identified bottom-up estimates support the feasibility and alignment of the top-down estimate

There is still potential to unlock

Sectors with high impact potential, but low data ecosystem maturity:

- Road logistics
- Road passenger traffic
- Household expenditure on transport and transport expenditure of business have similar magnitudes

Sectors with moderate impact potential and moderate ecosystem maturity

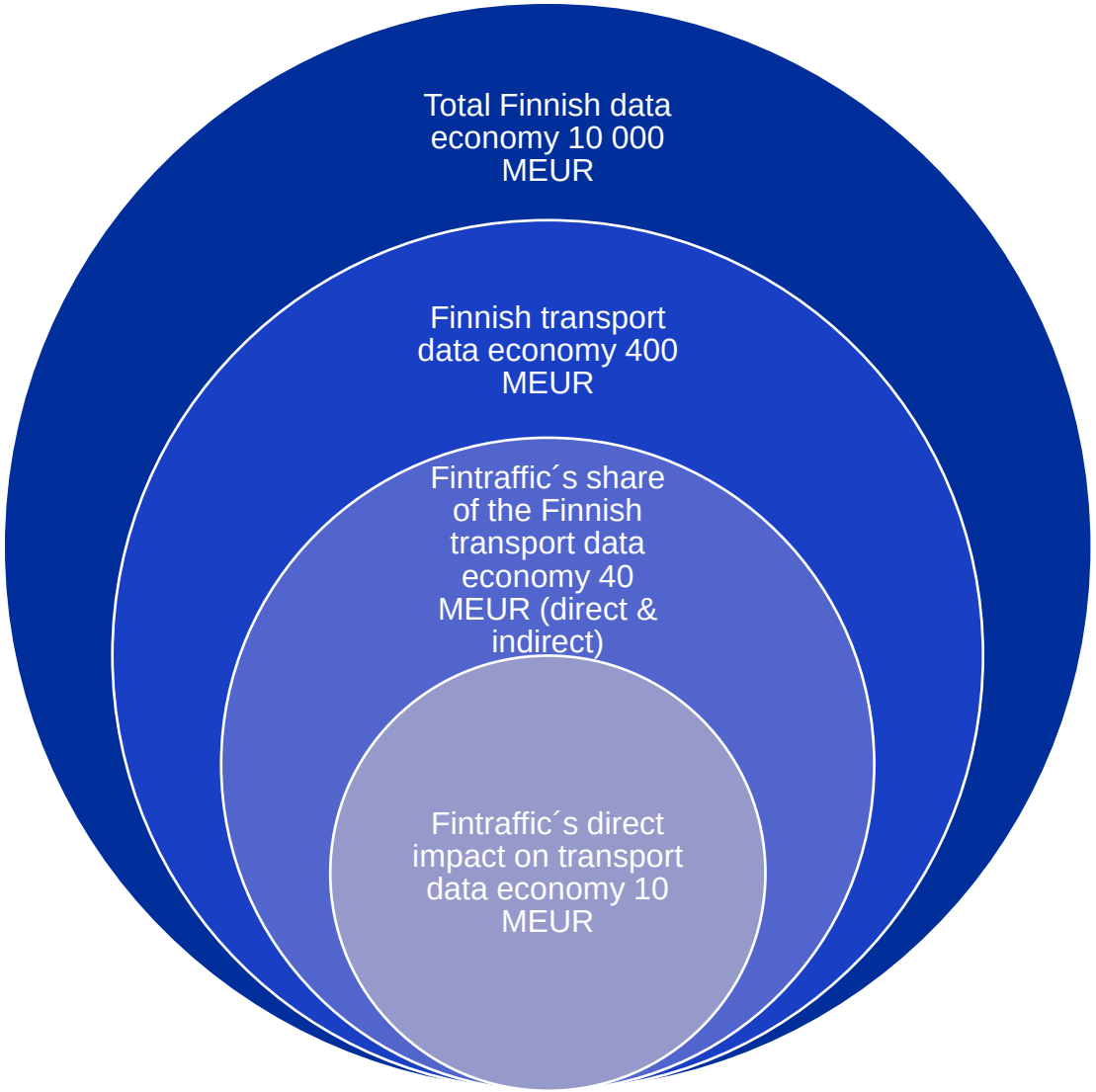
- Multi-modal passenger transport services
- Maritime logistics
- Rail logistics

Sectors with low impact potential but high ecosystem maturity

- Aviation

* European Comission / Flou: Depending on the assumptions for capitalization of transport system benefits as business impacts vs. as societal benefits ** Matka-vastus in Finnish

Executive summary – Fintraffic´s share (2/3)



Executive summary – Challenges and actions (3/3)

Limited data available

There is limited data available on the traffic data ecosystem. Different studies use different scopes, methods and definitions of data ecosystem.

Estimating the impact of data is a major challenge in all industry sectors. **In transportation, benefits are both direct (revenue from data-based solutions) and in-direct (e.g. fewer accidents, better punctuality). The chain of impacts (and supply chain of data) is long and nonlinear and depends heavily on the use case.** Approximations and case studies are needed to assess the impacts.

Open data is currently shared through Digitraffic and Digitransit platforms. Due to technical limitations, the number of developers and end-users, use cases and reach of data is unknown. Digitraffic and Digitransit are not only traffic and transport data sources used by the developer and end-user community.

Actions needed

Value can be unlocked in both passenger transport and logistics. Direct business impacts are likely higher in logistics, whereas passenger transport has more impact through socio-economic impacts such as travel time saving and reducing externalities of traffic.

By acting as a data intermediary, Fintraffic can promote the use of traffic data and sharing it by offering a curated data platform that ensures the quality and standardization of the data. Further, promoting collaboration and raising awareness is required. Fintraffic needs to ensure also socio-economical benefits are unlocked, not just business value.

Transport digitalization is mainly dependent on internal efforts of different organizations. Promoting the use of data accelerates the development and open data lowers the barriers to experiment with the data.

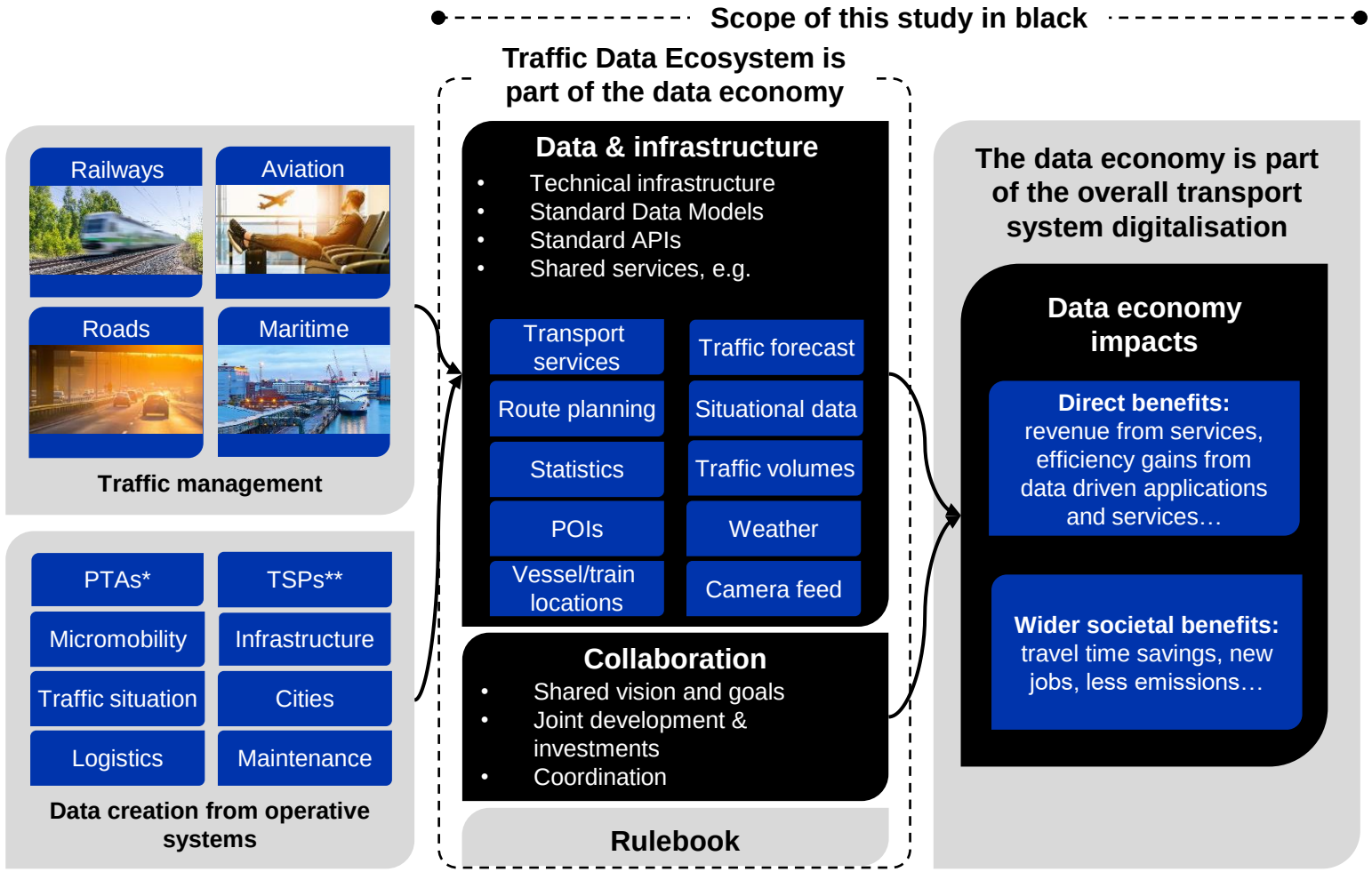
Measuring the impact

1. **Conduct (annual) surveys on data and data use and/or interview companies**
    - Number of companies, size, productivity of companies, products & services using the data and impacts of data.
    - Monitor investments in transport data (companies)
2. **Gather user feedback**
3. **Evaluate value of data projects (case study library).**
4. **Measure the number of external data sources on Digitraffic platform**
5. **Monitor the use of data**
6. **Monitor the number of users on Fintraffic's service and extrapolate the overall market based on the market share**

1. Description of Traffic Data Ecosystem

And methodology & limitations

Traffic Data Ecosystem can unlock the potential of Finland's transport data economy



In 2022, Finland's data economy was **~10 bn EUR**, according to a recent report from IDC on behalf of European Commission with **transport sector contributing 400 MEUR (3.8%) of the total.** [1]

The forecast for transport sector's data economy **in 2030 is 660 MEUR.** [1]

The estimates may not fully capture the wider societal benefits of transport. If **wider societal benefits are considered, the transport sector data economy could reach 1600 MEUR by 2030.**

The results reflect the impact potential of the traffic data ecosystem, not verified impacts

Methodology

Top-down estimates:
The top-down estimates are based on European Commission's report on European Data Markets (2023)[1]. Based on the information available, the "induced impact" defined in EDM 2023 study might not fully capture the wider societal benefits of traffic. Thus, when estimating the impact potential of the Traffic Data Ecosystem, only impacts described by European Commission's report as "direct impacts" and "forwards and backward indirect impacts" (revenue from data, efficiency gains in organizations, increased revenue from new data-enabled services etc.) are considered as "direct impacts" in our methodology and "induced impacts" are excluded. The new "direct impacts" are then scaled with factor of 2.5 to model the wider societal benefits, such as travel times savings. The scaling factor is based on European Commission's report "Creating Value through Open Data" (2015).[2] These give the upper and lower bound for the wider societal benefits. Further, the transport data economy includes the infrastructure. In Finland, roughly 12% of the yearly expenditure is on transport infrastructure and 88% on transport in logistics and household spending on transport.

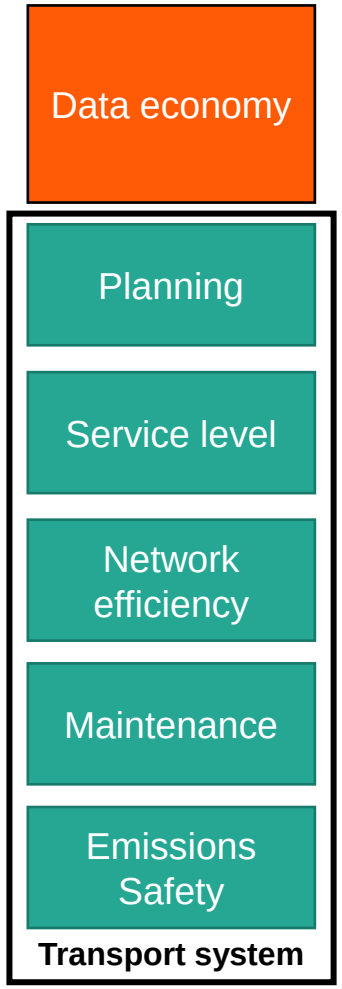
Bottom-up estimates:
Bottom-up estimates of identified impact types were studied to validate the top-down estimate's feasibility. Bottom-up estimates focus on the socio-economic impacts, which discount some of the direct impacts of data economy. Bottom-up estimates were calculated for value chains that could be supported with evidence from literature or expert assessments.

Value chain:
A simplified data value chain has been used on determine the impact awarded to Fintraffic in both top-down and bottom-up estimates. The value chain consists of three parts: Data creation (raw data), distribution & refining (integration, quality control, distribution), end-user services. The value chain is based on model introduced in Hautala & Leviäkangas (2007)[3]. As no benchmark was identified for weighing the value chain, 20% + 20% + 60% was used to emphasize the role of end-user services delivering the impact. These coefficients were then multiplied with Fintraffic's "market share" in each step before the overall impact factor was calculated. The "market share" estimates for bottom-up estimates are based on interviews with Fintraffic's experts. As there are no empirical evidence, these figures should be considered indicative.

Limitations

- Empirical evidence on impacts of data in transport is lacking.
- Empirical evidence of impact of different roles in data ecosystems is lacking.
- Bottom-up estimates sensitive to assumptions and not mutually exclusive or completely exhaustive.
- Different data market/data economy estimates use different methods and definitions. Comparisons between studies are not 1:1.
- The direct market impact figures may discount the wider societal benefits, but the extent is unknown.
- Direct business impacts, economic impacts and wider societal impacts have monetary values, but apples to apples comparison are not possible. Summing the results skews the results.
- Separating between direct business impacts and wider socio-economic benefits is challenging
- Value chains and contribution of Fintraffic are based on expert assessments
- As there are limited evidence on the impacts of data economy (especially in transport sector), the presented figures should be interpreted as impact potential.

The benefits are scattered in the different value chains in different modes of transport



Organisations benefit directly from using data to create new products and services or enhance the existing ones, while the users of the services save time, reduce costs or generate more revenue. For example: PortActivity app has allowed different transport operators to coordinate their port operations through accurate time of arrival estimates for ship and use the information in their planning and management systems

In addition to direct benefits observed through increased revenue, data economy has potential to have wider societal impacts, some of which also directly benefits the travellers and transport operators. The main categories for transport system related impacts are planning, (public transport) service level, network efficiency, maintenance and externalities such as emissions and safety.

Currently, the data ecosystem mainly benefits users through real-time traffic information from road transport as data sharing between ecosystem partners is limited and data market is not established.

Historic traffic data from road and railroads is extensively used in infrastructure and transport service planning. For example, detailed open data on rail traffic delays has enable pinpointing capacity constraints of physical infrastructure leading to better investments.

It should be noted, that improvements to transport system through better traffic management, capacity investments and digitalisation are adjacent to data ecosystem benefits, but the impacts are not mutually exclusive.

Not all data is open or free.

While there is limited open data available in aviation, data sharing and data ecosystems are highly established in Aviation, enable by the high integration of different stakeholders through strict regulation.

The maturity of data ecosystems highly correlates with the traffic management activities. In aviation and maritime operations, traffic management has higher impact of efficiency of the overall transport system compared to road transport.

Drawing the line between traffic management, digitalisation, operational use of data and “data ecosystem” is challenging. Data and collaboration is one tool in the overall digitalisation framework. For example, open data shared by Fintraffic has high potential on improving the rail traffic management.

2. Impact Potential of the Traffic Data Ecosystem

Fintraffic as “data intermediary” can be awarded some of the overall traffic data economy impact

Traffic data economy in Finland, 2022

230 M€

Direct business impacts

90-651 M€

Wider societal benefits

The overall impact potential is challenging to gauge, the wider societal benefits are likely somewhere in-between the range presented

Currently, majority of data in the Traffic Data Ecosystem is produced, quality controller. Fintraffic currently hosts many end-user services, such as train schedules, multimodal journey planner (in cooperation with PTAs) and road conditions.

When the traffic data ecosystem matures, more and more data is shared between the ecosystem members and the role of Fintraffic diminishes. Based on the value stream above and current role, a realistic estimate of Fintraffic’s market share is 10% of data creation, distribution and redefining and 0% of the end-user services, **the overall contribution of Fintraffic is estimated to be approximately 4%.**

Impact awarded to Fintraffic through ecosystem activity and providing open data

10 M€

Direct business impacts

4-26 M€

Wider societal benefits

The data economy is expected to have strong growth in the upcoming years at 5%+ rate

Traffic data economy in Finland, 2030

399 M€

Direct business impacts

179-997 M€

Wider societal benefits

The overall impact potential is challenging to gauge, the wider societal benefits are likely somewhere in-between the range presented

Currently, majority of data in the Traffic Data Ecosystem is produced, quality controller. Fintraffic currently hosts many end-user services, such as train schedules, multimodal journey planner (in cooperation with PTAs) and road conditions.

When the traffic data ecosystem matures, more and more data is shared between the ecosystem members and the role of Fintraffic diminishes. Based on the value stream above and current role, a realistic estimate of Fintraffic's market share is 10% of data creation, distribution and redefining and 0% of the end-user services, **the overall contribution of Fintraffic is estimated to be approximately 4%.**

Impact awarded to Fintraffic through ecosystem activity and providing open data

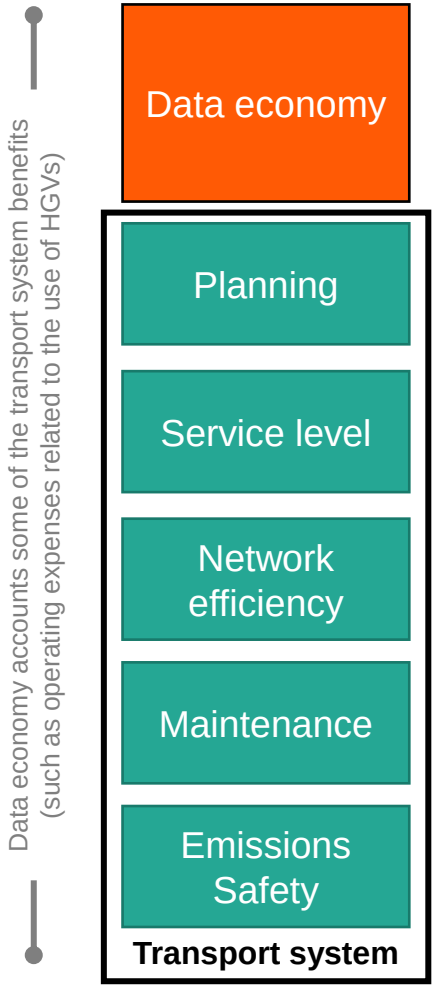
16 M€

Direct business impacts

7-40 M€

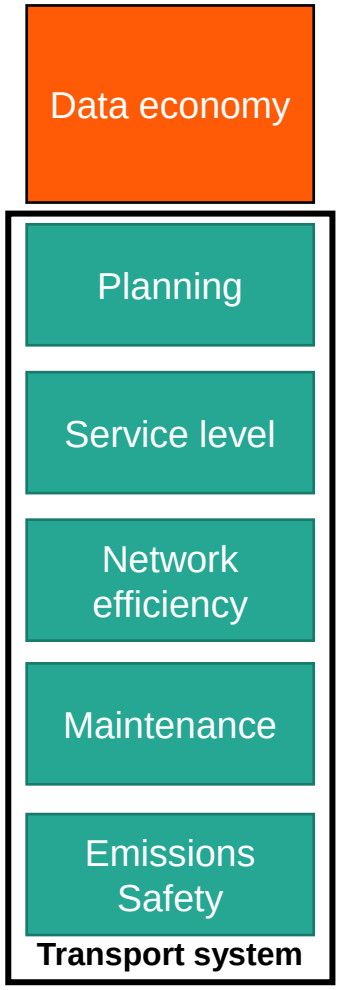
Wider societal benefits

Based on the literature, possibilities for the use of traffic data are plenty but evidence is lacking



Type of impact [4, 5, 6, 7]	Type of data driven service (examples)	Data examples[4]
New services and products New jobs Lower transaction costs, less labour costs Operational improvements, efficiency	Logistics planning	Real time freight vehicle location and capacity
Optimal infrastructure investments Improved resilience Better capacity planning and demand mgmt. Scheduling, routing	Decision support (data analytics, historical data)	Historic traffic volumes (all modes) Upcoming maintenance activities
Reduced generalized costs (e.g. reduced waiting & travel time, higher reliability) Changes in mode choice Improved availability of services	Enhanced journey planning MaaS applications Passenger information services (incl. delay notifications)	Multi modal journey information/services Real time vehicle locations, arrival and departure information Occupancy data, fare information
Shorter travel time, reduced congestion Improved estimated time of arrival, punctuality Reduced operating expense Improved terminal capacity management	Navigation services based on real time data Real time delay/accident/roadwork notifications Arrival time information Speed advice (maritime)	Real time parking information Traffic speed, congestion Accidents, roadworks Speed limits
Improved timeliness of maintenance Reduced material and operating expenses Reduced number of accidents	Maintenance optimization	Asset condition Local weather Traffic volume
Reduced number of accidents Altered driving behaviour Less emissions (induced impact) Health benefits Reduced traffic noise	Real time traffic notification Optimized routing Congestion avoidance Sustainable mobility services	Local weather Accidents, congestion, roadworks

The bottom-up estimates support the feasibility and alignment of the top-down estimate



Type of impact	Examples of impact potential identified
New services and products New jobs Lower transaction costs Better support for decision making (consulting) Better visibility to supply chain (logistics)	According to Sitra, organizations that use data in their business reported a **4% increase in productivity and a 6% increase in profitability**.[2]
Optimal infrastructure investments Improved resilience Better capacity planning and demand mgmt Scheduling, routing	Not validated (yet)
Reduced generalized cost (e.g. reduced waiting time, shorter travel time, reliability) Changes in mode choice Improved availability of services	**10-30 M€** (FT: 3-6 M€) in time savings from real time information and reduced perceived wait time in public transport **+1-2 M** (FT: +0.3-0.5 M) new PT trips
Shorter travel time, reduced congestion Improved estimated time of arrival, punctuality Reduced operating expense Improved terminal capacity management	**1-40 M€** (FT: 0.3-4 M€) in traffic avoidance **0.2-3 M€** (FT: 0-1 M€) in logistics punctuality **Tens of millions** in maritime logistics JIT operations
Improved timeliness of maintenance Reduced material and operating expenses Reduced number of accidents	Not validated (yet), partially covered in Fintraffic's other services to maintenance stakeholders
Reduced number of accidents Altered driving behaviour Less emissions (induced impact) Health benefits Reduced traffic noise	**1-5 M€** (FT: 0.2-0.9 M€) in accident avoidance

Only some of the value chains have been identified and estimated.

Traffic Data Ecosystem's potential is highly correlated with the overall digitalisation of the transport system.

Comprehensive analysis of the current data flows, end-user services and impacts is needed to fully validate the impacts.

There is overlap in the direct & indirect impacts and wider societal benefits. The bottom up-estimates measure the socioeconomical impacts instead of direct business impact.

The way data reaches its end-users varies by mode of transport and value chains within them

Travellers are to be reached through travel journey applications and by integrating traffic system data into the systems used with a single source of truth. **Based on a recent study conducted in the Netherlands[8], travellers only use 1-2 apps or websites to find their digital travel information, with Google Maps ranking first for car travellers and local journey planners for public transport travellers**. **Open data is also distributed through traditional media channels: Radio Nova has nearly 1M weekly listeners and has profiled itself as the channel for drivers[9].**

In Finland, driving assistant systems are, which likely correlate with the vehicle integrated advanced traffic information systems (such as capability to receive RTTI information)[10]. **Thus, drivers are best reached through apps and similar vehicle agnostic solutions. For example, an app designed for truck drivers called Tietorahti has 13 000 regular users and is based on Digiroad and Digitraffic's open data.**

In logistics, end-users are not only drivers but also transport and logistics operators, logistics planners and dispatchers. These users are best reached through IT software instead of apps.

Finally, transport system planners, researchers and policy makers make use of both real-time traffic data but also historical data to support decision making and enable better analysis.

Insights from the Netherlands[8]

3 out of 4 car travellers use smart phone to receive travel information and 62% also use navigation system when travelling. 3 out of 4 car travellers feel digital travel information is a necessity.

90% of public transport travellers use digital forms of travel information, mostly through smartphone apps or websites.

Most respondents experienced more flexibility in departure time, shorter journey time, improved route choices and more safety during their journey.

10-30% of respondents reported digital travel information has impacted their mode choice and ability to combine transport modes within a journey.

Better use of traffic data can unlock potential in logistics

	Aviation	Rail	Maritime	Road
Current ecosystem maturity				
Logistics volume, domestic (Million tonne)[22]	Only a fraction compared to other modes	24	5	255
Logistics volume, import/export (Million tonne) [22]	Only a fraction compared to other modes	16	94	4
Impact potential				
Reasoning	Example for other sectors in terms of ecosystem maturity. Low volumes decrease the impact potential.	Most of the benefits of data can be achieved through better infrastructure investments and traffic management.	Fintraffic has been an active player in maritime logistics, where it supports ports and other stakeholders with data from traffic management to enable just-in-time operations.	Majority of cargo is transported on the road. The market is scattered to few major players and abundance of SMEs, which makes scaling of solutions challenging and requires active ecosystem efforts.

Better use of traffic data can unlock potential in passenger traffic, market size similar to logistics

	Private car (driver & passenger-km)	Rail	Bus	Maritime	Aviation
Current ecosystem maturity					
Number of trips (million)[23, 24, 25]	2675 (driver and passenger, 2021)	88 (2021)	167 (2021)	13 (foreign sea transport passengers, 2022)	15 (domestic and international, 2022)
Passenger-km (million) [23, 24, 25]	55 342	3047	2061	N/A	N/A
Impact potential in passenger transport					
Reasoning	Passenger transport benefits from reduced externalities and travel time savings.	Reducing generalized travel cost (trip impedance) increases the use of sustainable travel journeys has still untapped potential. MaaS uncertain, public-sector efforts needed to support positive modal change.	Reducing generalized travel cost (trip impedance) increases the use of sustainable travel journeys has still untapped potential. MaaS uncertain, public-sector efforts needed to support positive modal change.	Most benefits to be awarded through logistics and not passenger traffic. Impact potential of real-time travel information not assessed.	Impact potential of real-time travel information not assessed.

3. Strategic Considerations & Conclusions

Main challenges related to data ecosystems and digitalisation – travel journeys

Barriers in travel journeys

The barrier to the realization of more sustainable travel chains is the so-called "**generalized travel cost**":

- The cost of the trip,
- Travel time, (walking time, waiting time and driving time), and
- Travel quality factors (travel frequency, punctuality, perceived safety and travel comfort, including passenger information and features of ticketing and payment systems)

In many cases the lack of mobility services (or weak competitiveness of the service vs. car) and cost/benefits compared to other mobility options are the main inhibitors of sustainable travel journeys. Largest cities are the main areas for potential.

Availability of data is one of the identified barriers. Emission reduction potential is not substantial (0.08 Mtons CO2) by 2030.[11]

Impact of digitalisation and action needed

From traveler's perspective, digitalization impacts mainly the travel quality factors, which in turn impact the perceived travel time. Easy access to travel information, real-time vehicle information, easy payment and ticketing systems, "one-stop apps", or assistance in changing from one mode of transport to another all impact the perceived service level.

On *strategic level*, digitalization and data-driven decision-making will improve the efficiency of transport system planning. On *tactical level*, digital tools and data can be used for public transport scheduling, for example on the load on public transport lines. On *operational level*, digitalization affects transport operators, for example: fleet management, human resources management.

1. Ensure data available is high quality.
2. Ensure buy-in from transport service providers
3. Enable research and informed decisions.

Measuring the impact

1. Use of public transport route guide/journeys made according to the route guide
2. Search & use of multimodal travel chains (Digitransit)
3. Measure the number of API queries (possibly combined with ticketing data)
4. Volume of multimodal data available (FINAP)
5. Number of transport service providers and mobility operators in the ecosystem

Main challenges related to data ecosystems and digitalisation – logistics

Barriers in data ecosystem

Organizational barriers are one of the main barriers for digitalization in logistics. In Finland, one of the biggest challenges of digital logistics is the highly fragmented field of players.
In logistics, a significant challenge is the lack of accessibility of data exchange between various applications and legacy systems with low level of automation.

Common challenges for all modes of transport **are data quality, transparency and availability issues**. Problems with cross-border data flows are common in logistics.

One of the challenges relates to the **breadth of the data sources.** Operational management requires data for: planning and routing, tracking, tendering, freight audit, load consolidation, accounting and invoicing and expediting, and fleet management, among others. The Traffic Data Ecosystem can provide some data for planning, routing and tracking shipments.

Impact of digitalisation and action needed

Key actions identified in previous studies include:

1. Promoting cooperation: training, information, cooperation
2. Public-private partnership and coordination of dialogue with public authorities and stakeholders
3. Implementation of statutory services
4. Promoting data standardization by creating a platform for data exchange that defines the ways to share data
5. Measures are needed to help small players. Cost-effectiveness is important, as investment capacity is limited.

Measuring the impact

1. Digitraffic API calls for different data sets
2. Number of registered apps/developers (up-coming requirement)
3. Productivity statistics in transport sector

Main challenges related to data ecosystems and digitalisation – data ecosystem[4, 12]

Barriers in data ecosystem

In general, the main challenge are not technical in nature but related to **transforming organizations and their operating principles.** Organizations often fail overlook the impact of data, possible due to lack of good metrics.

In terms of data sharing, **building trust and enabling senior management to understand the value of data is required.** Other considerations include identifying suitable commercial business models that benefit all parties. Ensuring high quality and in standardized format enables effective use and integration of data. A data intermediary, such as Fintraffic, is often required to accelerate the development.

Not all **data** poses business value, but it may have **socio-economic benefits for the society.** For example, willingness to pay for safety related services in passenger traffic may be low, but the external costs carried by public sector are high. Enabling the use of such data may require public sector actions, promotion or investments.

Impact of digitalisation and action needed

1. Raise awareness e.g. with regular blogs that highlight use cases, best practices or new data sets
2. Ensure buy-in and coordination
3. Ensure standardization of data
4. Improve quality of data available (free of charge or for a fee)
5. Merge data from cities to national database, create connected data sets.
6. Identify data gaps together with the ecosystem and work together to close the gaps
7. Ensure socio-economic benefits are unlocked, not only private business benefits
8. Develop a library of case studies on data use.

Measuring the impact

1. **Conduct (annual) surveys on data and data use and/or interview companies**
   - Number of companies, size, productivity of companies, products & services using the data and impacts of data.
   - Monitor investments in transport data (companies)
2. **Gather user feedback**
3. **Evaluate value of data projects (case study library).**
4. **Number of external data sources on Digitraffic platform**

Sources

Sources

1. IDC 2023. European Data Market Study 2021-2023, D2.4 Second Report on Facts and Figures. Publisher: European Commission.

2. European Data Portal 2015. Creating Value Through Open Data. Publisher: European Union.

3. Hautala & Leviäkangas 2007. Ilmatieteen laitoksen palveluiden vaikuttavuus – hyötyjen arviointi ja arvottaminen eri hyödyntäjätoimialoilla. Publisher: VTT

4. Ricardo Energy & Environment 2017. Scoping Study into Deriving Transport Benefits from Big Data and the Internet of Things in Smart Cities. Publisher: Department for Transport (UK).

5. Lauhkonen & Lehtonen 2021. Ajantasaisten liikennetietopalvelujen hyväksyttävyys ja tarve raskaassa liikenteessä. Publisher: Traficom.

6. Schirokoff et al. 2013. Liikenteen hallinnan vaikutukset tie-, rautatie-, ja meriliikenteessä. Publisher: VTT.

7. Kulmala et al. 2020. Tieliikenteenhallinta- ja älyliikennehankkeiden arviointiohje.. Publisher: Väylävirasto.

8. Durand et al. 2023. Use and perceived effects of digital travel information for car and public transport travel. Publisher: KiM Netherlands Institute for Transport Policy Analysis.

9. Radiomedia 2023. Radiokanavat. Cited 29.5.2023.

10. Pilli et al. 2022. Kuljettajan tukijärjestelmien yleisyys Suomessa vuonna 2022. Publisher: Traficom

11. Sihvola et al. 2021. Liikenteen palveluistumisen vaikutukset liikenteen kasvihuonekaasupäästöihin. Publisher: Ministry of Transport and Communications.

12. Department for Transport 2023. Transport Data Strategy. Publisher: Department for Transport (2023)

13. Welle Donker 2018. Funding Open Data. Publisher: Information Technology and Law 30.

14. Welle Donker & van Loenen 2018. Societal costs and benefits of high-value open government data: a case study in the Netherlands. Publisher: Proceedings of the 21th AGILE International Conference on Geographic Information Science: Geospatial Technologies for All.

15. PrepDSpace4Mobility. 400 data sharing ecosystems exist withing the EU in the mobility sector.

16. Saarinen et al 2014. Kelitiedon vaikuttavuus. Publisher: Liikennevirasto.

17. Leviäkangas & Molarius 2020. Open government data policy and value added - Evidence on transport safety agency case. Publisher: Technology in Society 63.

18. European Commission 2023. European data strategy.

19. Christidis & Ibáñez Rivas 2012. Measuring road congestion. Publisher: Publications Office of the European Union.

20. Taival.com & Fintraffic 2023. Value Potential & Exchange Hypothesis for Voyage Planning and JIT Arrival.

21. Martens et al. 2020. Business-to-Business Data Sharing: An Economic and Legal Analysis. Publisher: EU Science Hub.

22. Traficom 2023. Tavaraliikenne Suomessa. Publisher: Traficom.

23. Kallio ym. 2023. Henkilöliikennetutkimus 2021. Publisher: Traficom.

24. Statistics Finland 2023. Number of passengers in foreign sea transport was 67 per cent of the pre-pandemic level in 2022. Publisher: Statistics Finland.

25. Finavia 2023. Matkustajatilastot aiemmilta vuosilta (Excel).. Publisher: Finavia.

Thank you!

Contact for more information to Serkan Tetik

serkan.tetik@fintraffic.fi