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TOWARDS A FAIR DATA ECONOMY

KEY LESSONS FROM FINLAND ON BUILDING A NATIONAL ROADMAP

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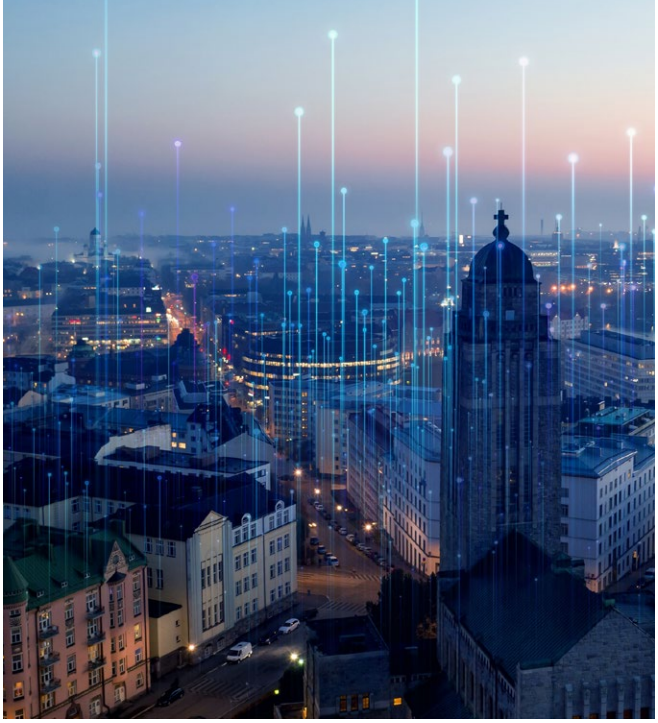
INTRODUCTION



The digital revolution is only getting started. Until recently, digitalization and technological advances had mostly transformed select industries, but in the last few years, their impact has increasingly started to permeate more and more sectors of the economy and society. Indeed, the advent of emerging technologies, from artificial intelligence (AI) to quantum computing, combined with the exponential growth of digitally stored information (i.e., data), offer a vast range of future opportunities.

For example, many businesses have gradually started to comprehend the significance of data for their day-to-day operations and are now using it to streamline and automate processes, develop new, innovative, and efficient products and services, and introduce new ways of working.[1] Similarly, public institutions, such as schools and hospitals, are increasingly using data solutions to operate more efficiently and deliver added value to the broader society. If properly harnessed, data has the potential to improve our collective well-being and prosperity and address pressing societal issues, such as climate change, financial inclusion, and the future of work.

However, the transition to a data economy at the societal level has been slowed down by an inadequate and siloed understanding of data development, evidenced by the persistently high barriers to data sharing and the widening skills gap between technophiles and the less tech-savvy.

A *fairer* data economy should therefore aim to address the existing power imbalances in data markets and strive for a more equitable distribution of data-derived value, while at the same time improving the conditions for individuals, companies, and societies to thrive.

Against this backdrop, the Finnish Innovation Fund, Sitra, embarked on a journey in 2022 to identify key bottlenecks and develop a national roadmap for a fair data economy (see Annex 1).

Finland is a leader in digitalization and data-driven value creation in terms of skill levels and digital infrastructure, but the efficient use of data for business transformation and human-centered public services is still in its infancy, calling for more ambitious efforts at public-private collaboration. To that end, Sitra established a platform with stakeholders from the public, private, and third sectors to advance key fair data economy actions: The Roadmap for a Fair Data Economy.

In a nutshell, the Roadmap network engages stakeholders to create a shared "will to act," implement actions in strategic focus areas, and collectively monitor the development of the data economy to guide Finland towards a fair transition. Key measures include piloting the implementation of digital product passports, creating EU data regulation online learning packages, and developing case studies on interesting data-sharing solutions.

The work of the network will continue until mid-2025, but though it is still too early to comprehensively evaluate the outcomes, some preliminary recommendations can be made based on the collaborative work carried out in the main focus areas. To achieve systemic change, these aspects will need to be realized at both the national and EU levels through an enabling regulatory framework and ambitious and inclusive data policies and strategies.

2. TOWARDS A FAIRER DATA ECONOMY

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2.1 A FAIR DATA ECONOMY CHALLENGES THE STATUS QUO[2]

Fact Box 1: What is a fair data economy?

The part of the economy that focuses on creating services and data-based products in an ethical way. Fairness means that the rights of individuals are protected, and the needs of all stakeholders are taken into account in a data economy.[3]

Because the data economy affects us all, it is crucial to ensure that its risks and benefits are shared equitably across society. The need for a fairness-based model becomes evident when we look at the current state of data economies, where we can identify at least three types of injustices:[4]

01 **Local data economies face unfair competition** as Big Tech and large enterprises dominate startups and SMEs, concentrating market power in the hands of already dominant players. Europe is falling behind globally, with US- and China-based companies leading the way.

02 At an individual and community level, data hoarding practices harm privacy and can sometimes lead to violations of data protection rights, such as the General Data Protection Regulation (GDPR). Due to the limited options for alternative digital services, **individuals struggle for their digital sovereignty and are dependent on major tech companies.**

03 Societal risks include **threats to democracy**, as seen in the Facebook-Cambridge Analytica scandal, where personal data was misused for targeted political campaigning, highlighting a corporate culture that disregards privacy.[5]

Instead, a fair data economy would address the various power imbalances that exist across society and strive to reduce the inequities that result from them. In such a model, markets would be open for enterprises of all sizes and welcome companies, individuals, and societies from across the world. Individuals would not be left to fend for themselves against law-breaking companies, and consumers would have real choice in the technologies and digital services they use. It would also prohibit interference in democratic processes, including manipulation through misinformation and targeted disinformation.

> A fair data economy model is therefore the sustainable way forward for the EU and the world.

To follow it, we must address the issues that currently limit the potential of the data economy and promote a fairer and more sustainable future for all stakeholders.

Data currently serves people as customers, but it is citizens who are at the heart of the fair data economy.[6] Therefore, the quality of data-driven services should be measured against the principles of a fair data economy. This fairness would be reflected in how well the data rights of different stakeholders are realized in practice in digital services, in line with new EU regulations and standards.

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Increasing data skills in companies would also significantly improve the development of more human-centered services that could help enforce trust between stakeholders, as less than half of the respondents to the business survey considered themselves capable of operating in the data economy.

The data economy surveys of individuals and businesses in Finland show that people's main concern is the leakage of their personal data when operating in the digital environment.[7] Indeed, more than half of respondents feel that data protection is too often left for the individual to enforce. But although transparency measures are making an impact—for example, 83% of respondents to the citizen survey say that actions such as presenting terms and conditions of data use in an understandable way helps them increase trust in a company—, less than half of companies in the business survey reported adopting such measures.

Increasing data skills in companies would also significantly improve the development of more human-centered services that could help enforce trust between stakeholders, as less than half of the respondents to the business survey considered themselves capable of operating in the data economy. Indeed, only a third of companies reported having a formal data strategy in place to guide the use and sharing of data.

Fact Box 2: In a fair data economy

01. Companies will benefit from a level playing field that fosters innovation and provides equal opportunities for success in a balanced market.

02. Individuals will be able to trust organizations to handle their personal data responsibly and have access to a variety of high-quality, reliable services and products.

03. Societies will be more prosperous and better able to function, leading to improved overall well-being.

2.2 MAKING DATA SERVE PEOPLE AND BUSINESS IN EUROPE

In the European Union, the current decade has seen remarkable focus and investment in promoting the concept of a *fair* data economy. Brussels emphasizes the importance of aligning the data economy with European values, and the EU is combining its regulatory power and financial commitment to make this aspiration a reality.

The European Data Strategy and the Digital Decade program provide a framework that outlines the EU's data economy goals.[8] As a result, the data economy regulation in the EU is now undergoing a major transformation as a tool to achieve these aims.[9] The new legislation is seen as beneficial to the development of Europe's digital economy and, ideally, as a model for other countries outside the bloc. The regulatory framework implementing the EU's data strategy aims to create a single set of rules and a level playing field for all actors, and to increase the use of data in the EU's internal market. In other words, it aims to create a functioning internal market for data in the EU.

In practice, these reforms should level the playing field and help smaller companies compete with digital giants, allow individual users to benefit from a safer online environment, and ensure that the public sector has wider access to innovative services.

Fact Box 3:
The European Data Strategy of 2020

The European Data Strategy is a policy program with a vision to "create an attractive policy environment" that will boost the EU's share and role in the global data economy by 2030. To achieve this vision, the European Commission has identified several tools: fit-for-purpose legislation and governance to ensure the availability of data; investment in standards, tools, and infrastructure; and skills for handling data.

The new data legislation introduced by the European Data Strategy significantly reforms the EU's business environment. It creates a framework of rules based on European values that enable data to power society and economy. This include:

- Fair competition between companies in digital markets (Digital Markets Act, DMA)
- New obligations to improve the transparency and security of digital services (Digital Services Act, DSA)
- Safe and ethical use of artificial intelligence (Artificial Intelligence Act, AIA)
- More efficient use of data from smart devices and cloud services (Data Act, DA)
- Better use of public sector data and new collaboration models (Data Governance Act, DGA)
- Improved cyber security (Network and Information Security Directive, NIS2)
- Greater interoperability of different data sources for the public sector (Interoperable Europe)
- Digital identities for individuals and businesses (eIDAS2)

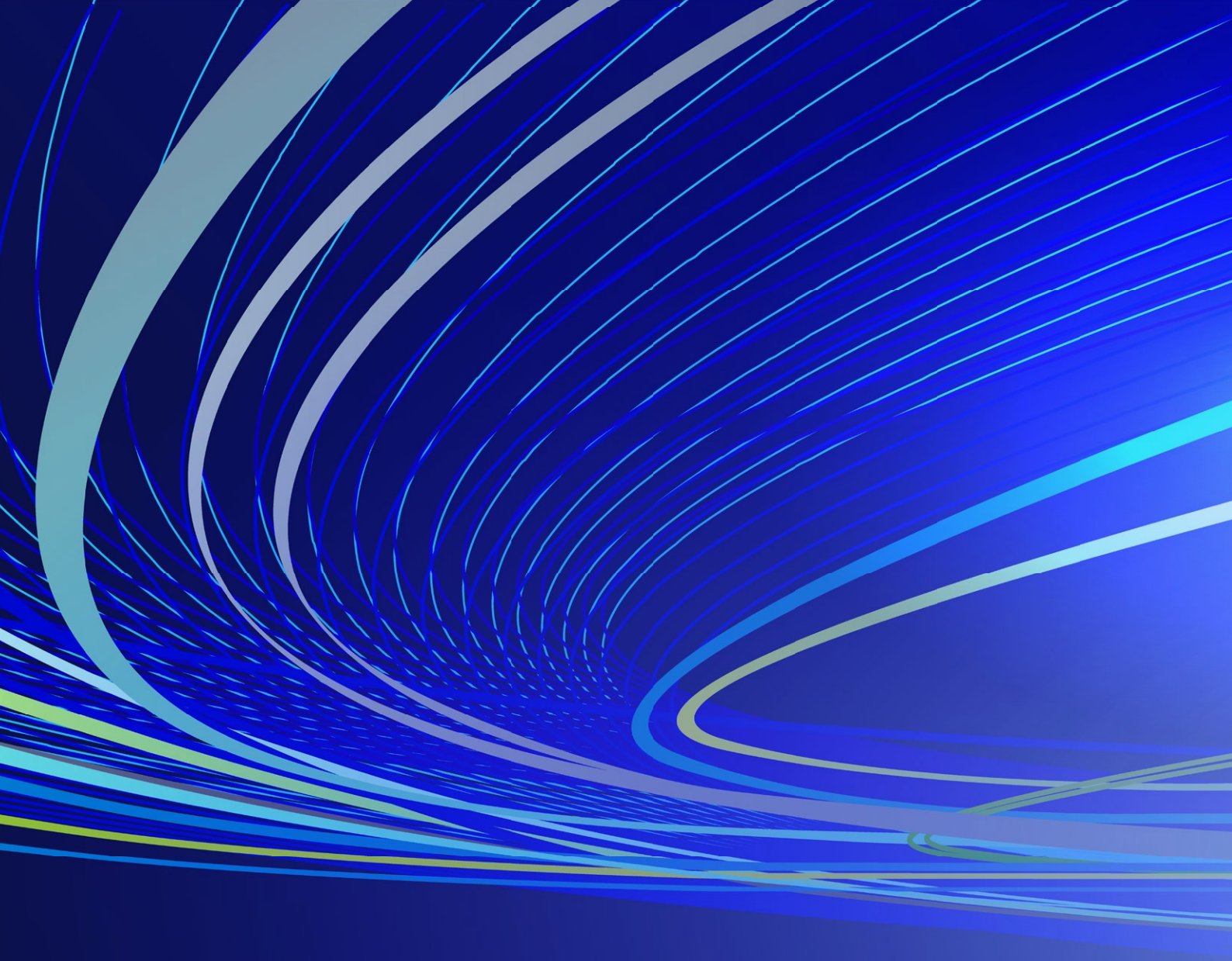
Beyond the internal market, however, the EU also aims to have a similar impact on data regulation worldwide as it did with the GDPR, which has shaped the data protection landscape in jurisdictions around the globe.

A new single market for data, as envisaged in the European Data Strategy, could help realize the benefits of data in different areas of society, such as healthcare and the circular economy. To date, nearly two billion euros have been invested in data spaces, cloud, and AI through various funding instruments.[10]

Although most of the new data legislation that was announced as part of the European Data Strategy is yet to be implemented, it is fair to say that the plan has already served as a crucial tool to accelerate digital transformation in the EU. From now on, the successful implementation of the European Data Strategy will be a critical factor in strengthening the competitiveness of European industry and the sustainable well-being of EU citizens.

However, there is still a long way to go. To monitor the gradual change and the steps taken along the way, a knowledge base is needed to track cross-border data exchange and mobility within the single market. For example, one sign of a successful European data economy would be the seamless sharing of health data between member states, as EU citizens already enjoy free movement and so health data may not be specific to one member state only.

To guide and harmonize these efforts, the Commission has published Europe's Digital Compass, which is setting targets for developing skills, government, business, and infrastructure for the "digital decade" leading to 2030.[11] Each of these pieces of the policy puzzle will affect European individuals and businesses as the single digital market—common European data spaces—evolves.



3. A NATIONAL ROADMAP FOR A FAIR DATA ECONOMY

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Finland tends to rank high in international comparisons measuring the development of digitalization. In fact, the country came first in the European Union's latest Digital Economy and Society Index (DESI) from 2022, scoring almost invariably higher than the EU average across the study's different metrics.[12] Indeed, technological progress, widespread digitalization, and data-driven value creation offer Finland great opportunities to increase its competitiveness and productivity.

However, a leading position in digitalization comparisons does not automatically indicate a corresponding ability to seize the potential of a data-driven society. A study by Sitra comparing the state of Finland's data economy against a selected number of European member states showed that the country actually lags behind in revamping its economy and competitiveness with data.[13] Moreover, the advancement of the data economy did not appear to be a clear strategic goal among the various stakeholders from the public and private sectors involved in the study.

As the digital revolution affects people's lives and daily activities in many ways, their skills and readiness to operate in the data economy will also need to be strengthened. This transformation must be equitable and leave no one behind, but no society transitions to a flourishing data economy without a common strategy. In Finland, this transition has been slowed down by an inadequate and siloed understanding of the data economy, barriers to data sharing, skills gaps, and attitudes.

> It was therefore recognized that new ways to accelerate the data economy were urgently needed to strengthen Finland's competitiveness and generate prosperity.

Calls for a national strategy to help develop the country's data economy increased. But for Finland to succeed, better cooperation and communication between stakeholders would be key, as would a measure of strong leadership. Indeed, past efforts had been too scattered and uneven, which had only slowed down progress.

Against this backdrop, in November 2021 Sitra launched a project to develop a National Roadmap for a Fair Data Economy.[14] Sitra is an independent and non-partisan future fund that connects different stakeholders and works together with partners to conduct experiments that strengthen the reform and resilience of society.

> The aim of the project was therefore to create a grand strategy for Finland to succeed in the data economy on fair terms through close public-private cooperation.

The project brings together key stakeholders and high-level experts from the public, private and third sectors to discuss the desired outcomes and the steps to be taken.

> Finland urgently needs to create fair data economy structures and solutions to use data to renew business, strengthen productivity and prosperity, and achieve positive environmental impacts.

3.1 THE ROADMAP IS A PROCESS: MOVING FORWARD WITH COLLABORATIVE ACTION

In the spring of 2022, when the roadmap preparation started, Finland did not have a national data strategy or even an action plan focused on promoting the data economy. Interviews and data analysis were used at an early stage to identify Finland's opportunities and weaknesses, as well as priority areas for action, key stakeholders to engage with, and the process for carrying out the project itself. Sitra then invited representatives from public, private, and third sector organizations involved in the data economy to form a high-level steering group and a secretariat. To engage with a broader range of stakeholders, discuss projects and practical examples, and get feedback on the roadmap activities, various public events were organized.

The first step was to find common ground. Based on the analysis of the current state of the data economy in Finland, the participating public and private sector organizations developed a joint "Will to Act", stating that *Finland urgently needs to create fair data economy structures and solutions to use data to renew business, strengthen productivity and prosperity, and achieve positive environmental impacts*. The network then identified strategic focus areas where change is most urgently needed and set aspirational goals for each one, identifying the key enablers and challenges that need to be addressed. To measure progress, a Data Economy Monitoring Tool was also developed to provide information on key areas of the data economy with both quantitative and qualitative indicators. The final step was to identify the key actions needed to promote the data economy. From an 'idea portfolio', the most impactful measures were selected and assigned to an 'action portfolio', which established concrete responsibilities, resources, and timelines , as well as a committed party to drive the actions through various activities.

Figure 1: Timeline of Finland's fair data economy roadmap process

The result of the project was presented and discussed at a public seminar in April 2023, where about 350 people participated in the discussion. The Finnish Data Economy Roadmap in its entirety has been published online as an informative source of data economy thinking, actions, and practical tools.[15]

Following the launch in 2023, actions are underway to continue the implementation of the roadmap work. These actions are allocated and classified under the key focus areas to find the balance between the prioritized themes. They are managed within a portfolio that is regularly reviewed in groups consisting of public and private sector stakeholders committed to carrying them out. Decisions on prioritization are taken by the steering group.

The impact of the roadmap process is measured regularly through interviews and surveys. The roadmap, including the Data Economy Monitoring Tool, the concrete actions, and the desired targets, will be updated through regular evaluation and testing with stakeholders.

> During the first year, the roadmap has already been proven successful at increasing collaboration, understanding, and situational awareness among the actors involved in the network.

The evaluation of outcomes as impact measures will be assessed towards the end of the project in 2025.

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The ‘Will to Act’ helps the different players in the public and private sector to take action within their areas of responsibility.

3.2 ROADMAP ELEMENTS TO STEER DATA ECONOMY DEVELOPMENT

The roadmap consists of three parts:

01 A shared ‘Will to Act’ to set goals on strategic priority areas

02 A set of concrete actions in the focus areas to improve real-world development

03 Situational awareness tools for better knowledge management

This section presents each one.

1. Creating a shared ‘Will to Act’ for goal setting and focus areas

The data economy ‘Will to Act’ is a joint statement by public and private sector actors. It describes the direction in which the participating organizations believe the data economy should develop in order to increase Finland’s competitiveness and economic resilience. The mission statement is to create fair data economy structures and solutions so that data can be used to renew business, strengthen productivity and prosperity, and achieve positive environmental impacts.

The ‘Will to Act’ helps the different players in the public and private sector to take action within their areas of responsibility. Priority areas indicate where change is needed to strengthen Finland’s competitiveness and where stakeholders are committed to take action.

The ‘Will to Act’ addresses six priority areas:

- Developing human-centered services
- Transforming business with data
- Strengthening Finland’s influence in the EU and thought leadership in the data economy
- Increasing understanding and skills in the data economy
- Building the infrastructure required for reliable data sharing
- Developing the funding models needed for the data economy and to target investments.

Figure 2: The 'Will to Act' as a shared vision of focus areas for data economy measures

For each of these focus areas, stakeholders identified the desired outcomes and the key questions to be resolved at different levels. For example, making public and private sector services more human-centered and fair was raised as a key area for change.

> In human-centered data-driven services, the rules must be clear, and users need to be told in an understandable and transparent way how their data will be used.

Similarly, for business transformation, there is a need to collect peer examples of how firms are using data through different technological solutions, provide peer learning opportunities, and support the establishment of collaborative networks or data ecosystems. Finally, training and upskilling efforts need to be considered in various educational programs, and attention should also be paid to the development of civic skills for operating in the data economy.

2. Concrete actions to improve the data economy in practice

Having established a common 'Will to Act' and identified the areas to focus on, the roadmap stakeholders selected key measures to move forward as concrete actions. Each of them has a responsible party who is accountable for its progress, resourcing, and outcomes. To date, the roadmap network has launched more than 20 actions to accelerate the growth of a data-driven economy (see Annex 2).[16]

For example, one of these 20 actions was to pilot 'digital product passports' in partnership with companies to advance the green transition. These provide consumers with information on product use, maintenance, raw materials, and recycling, which in turn helps improve transparency, collect data on sustainability, and facilitate the transition towards a circular economy. EU regulation will define data requirements for digital product information in the coming years and the European Commission has called for solutions from

Figure 3: Six focus areas of the roadmap, with examples of key actions.

industry to develop a digital product passport. This is a complex concept that requires collaboration between many parties to reap its benefits. Based on the pilot schemes, a dialogue between legislators and companies should take place to make the concept future-proof.

Key actions have also been launched in the social welfare and healthcare sector, where the potential of the better use of health data and data sharing between different entities for Finnish healthcare, research and companies operating in the sector is being explored. Sitra's report made recommendations and estimated that their implementation would result in annual cost savings of 770 million euros in social and health care. This could free up the work input of 5,000 nurses and 1,300 doctors for more efficient care work and help alleviate the growing shortage of healthcare professionals. The recommendations would also allow for the more effective and efficient provision of social and health care services, as well as a transition to more personalized health care and disease prevention. The next step is to start piloting the necessary solutions.

Business transformation is also being supported through various change programs. One of them is a Data Economy program of the innovation funding organization, Business Finland. The program provides companies with up to EUR 135 million to boost challenging data economy development projects. Similarly, a business training program, Growth from Data, is helping inspire and guide Finnish companies to develop new data-driven business based on fair rules and principles. Peer examples of data use are also being compiled for companies.

> As the data economy and the opportunities offered by data sharing are complex issues, the aim is to spread the word about good solutions and to inspire others to carry out data-driven activities.

Fact Box 4: Highlights of key actions

The roadmap network implements actions in the strategic focus areas of green transition, health and social affairs, and industrial transformation . Actions take different forms, such as pilots, learning materials, competitions or surveys that are conducted together with public and private sector organizations. They include pilots on the implementation of digital product passports, EU data regulation online learning packages, and case studies on interesting data solutions:

Digital Product Passport pilots are preparing organizations with the technical requirements to comply with upcoming EU regulations and adopt circular economy models based on material traceability. In 2023, various pilots are underway in the textile industry, especially in the recycling and upcycling of clothing; in logistics, to capture emission data along the value chain; and in energy, to find second-life uses for lithium-ion batteries.

Basics of EU data economy regulation—fair rules for online platforms course helps businesses and service users to understand the changing rules in digital services and online platforms. The course provides information on the rights of users in the digital world and on the opportunities the new regulation opens up for businesses. The training can be found on the eOppiva website and is free of charge for learners. In spring 2024, learners can also explore the topic together, for example in study groups.

EU Data Strategy 2.0 is a collaborative initiative dedicated to making recommendations to improve the European data strategy and strengthen the implementation of current EU regulations. The work covers topics such as strategic autonomy, the competitiveness of European industries, and the potential of RegTech to implement data regulation. A strategy paper will be published by the end of 2023 during the Spanish presidency of the EU Council.

The Most interesting Data Solutions initiative aims to raise awareness and encourage the development of data-driven solutions in various types of organizations by drawing from the experience of some of the most disruptive data initiatives around the world. The list is compiled as an open call to gain insights from interesting approaches, products, and services using data and highlight the benefits of these new solutions. The first set of examples will be announced by the end of 2023.

Data Economy program by the government organization for innovation funding, Business Finland, was prepared with the support of the roadmap stakeholder group. This program aims to help companies understand the added value and importance of data sharing, build global data economy ecosystems in Finland, and accelerate international business created using data economy solutions. The program will continue until the end of 2027, accelerating development projects with up to 135 million euros.

> Both public and private sector stakeholders need a more accurate and predictive view of data economy trends to better plan and develop their activities and capacities.

3. Situational awareness tools for knowledge management

Both public and private sector stakeholders need a more accurate and predictive view of data economy trends to better plan and develop their activities and capacities. As a result, the Data economy monitoring tool was developed in a collaborative manner to provide up-to-date information and support decision-making for businesses, developers, and policymakers. For the first time, Finland has a tool that brings together key indicators and qualitative information on the development of the data economy, which are based on public data sources. The report, its graphs and raw data can be freely used, downloaded, and further developed.[17]

As the data economy is a new and evolving phenomenon, information on all issues related to its development is not yet available. Therefore, the monitoring tool also acts as a collaborative platform to build the knowledge base and update the measurements and indicators to reflect users' different needs.

During the development of the tool, answers were sought, for example, to the following questions:

- How is Finland's data economy developing in relation to the EU and globally?
- Where is data being used, and what effects does its usage have on areas like improving societal services' functionality and productivity, enhancing business competitiveness and innovation, individuals' everyday lives with new services, and increasing well-being?

The tool, in Power BI format, provides information from the selected focus areas as well as general benchmarking information on Finland compared to the EU or global data economy development.

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As the data economy is by nature a global network, the monitoring tool also needs to reflect the national position in relation to the EU level, as well as the global trends of development. Cooperation with multinational organizations is a future way to build monitoring tools for the data economy.

The monitoring tool supports and complements targets of the EU Digital Decade—and in particular the national digital compass—in tracking data economy policy objectives.[18] It has been developed in parallel with the national digital compass work. Unlike the compass, however, the monitoring tool does not itself set national targets for development but rather aims to support common goals by providing a knowledge base on progress and opportunities in the data economy.

As the data economy is by nature a global network, the monitoring tool also needs to reflect the national position in relation to the EU level, as well as the global trends of development. Cooperation with multinational organizations is a future way to build monitoring tools for the data economy.

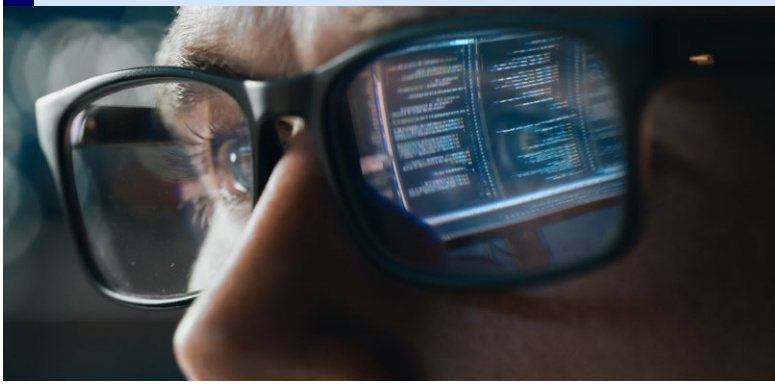
As data is collected over time, it will be possible to assess and forecast the development trends and detect connections between focus areas as system modelling. Recurring surveys will also be essential for building a database on the development of the data economy over time.

The various contents of the monitoring tool will change as the data sources are updated. For example, further light will be shed on the section on business transformation as national and EU-level statistical surveys develop (e.g. Statistics Finland’s business survey on the use of information technology in enterprises).[19] Emphasis is placed on areas that are critical to the development of the data economy , such as skills and capacity building (e.g. monitoring job vacancies and forecasting the demand for data professionals in industries as well as the supply of professionals as graduates of data-related programs, also reflected with qualitative data as a landscape of skills provision at all levels of education).

The monitoring tool will be further developed in a collaborative manner, taking into account links with national development programs, strategies and policy objectives. It will also address identified information gaps related to data economy development, in order to find innovative and resource-efficient ways to produce new data on the data economy using modern techniques.

Fact Box 5:
The Data Economy Monitoring Tool

- A Power BI reporting tool (currently available in Finnish) that helps the user to understand and monitor the development of the data economy.
- The tool compiles key indicators and useful open data sources on the development of the data economy in Finland.
- Intended as a knowledge base for those interested in the data economy and to support decision-making by experts, developers and policymakers.
- The report, its graphs and raw data can be freely used, downloaded, and further developed.



4. LESSONS LEARNED AND RECOMMENDATIONS

4. LESSONS LEARNED AND RECOMMENDATIONS

The national data economy roadmap process has created a shared common direction between the public and private sectors and increased situational awareness and collaboration among participants.

> The result is a unique combination of strategy, purpose, and an action plan with concrete experimentations that may be useful not only for policymakers but also for municipalities, companies, universities, non-profit organizations, and individual citizens.

The roadmap has already proven its impact by influencing Finland's new government program and encouraging the materialization of actions taken in the form of best practices and data models, data collaboration between organizations and across industries, and policy recommendations.

Solutions in the data-driven economy are not created by simply replicating the old way of doing things. Rather, it is the multiple collaborations between the public, private, and third sectors that are key, with concrete efforts and commitments to joint actions with shared resources and capacity building, such as investments in infrastructure, industrial renewal, or accelerating cross-sector data sharing and ecosystems.

As the roadmap process will continue until spring 2025, it is still too early to draw conclusions on the lessons learned. However, the process has already proven to be an appropriate approach and a concrete vehicle for advancing change in a complex phenomenon that requires collaboration between the public and private sectors. It has:

- Created a shared mindset about a path towards a fair data economy
- Offered a way to engage key stakeholders
- Built a path from plans to action, with ownership over implementation
- Inspired others to become involved in the transition
- Helped to find the right actions through experimentation, with the aim to enhance data use as well as to inform policy measures.

The following recommendations can be shared from Finland's fair data economy roadmap process for those planning similar impactful initiatives:

Strengthen collaboration and implementation.

The transition to a fair data economy requires supportive measures, unified coordination, active stakeholder collaboration, and action-oriented practices, such as experiments, trials, and collaborative projects.

Use metrics to support decision-making.

The development of the data economy is still poorly understood and there is a lack of information on its progress and impact to support decision-making. To this end, it is important to identify the key questions and resources needed to produce data on the data economy and its development. Relevant data can be collected in an open knowledge base and made available through a monitoring tool for use by different stakeholders.

Proceed through experimentation.

Experimentation should be used in the development of the data economy to test the functionality and effectiveness of new solutions. When experimentation is systematically integrated into the decision-making process, the impact and functionality of reforms can be flexibly tested, and solutions can be learned from and, if necessary, redirected before their implementation. The result will be higher quality and more innovative solutions that are known to work. The results of pilots can also inform policy measures as prerequisites of organizations, for example in implementing regulations.

The Roadmap work also serves as a platform to suggest policy recommendations for the development of the data economy at the national and EU level. As preliminary suggestions for policymaking, the following findings based on the roadmap actions can be shared:

01 **Integrate digital and green transition policies**. For example, data policies for the circular economy need to be highlighted, and digital product passports provide data solutions for material traceability and recycling strategies. Data and green policies meet in the implementation of standardized data forms for the green transition.

02 **Strengthen information on the development and impact of the data economy**, especially on productivity, growth, and industrial renewal, in the context of the EU Digital Decade key performance metrics in order to take informed actions and foresight-based decisions in the data economy. The Roadmap's situational awareness process and tools provide an approach to monitor the progress of the data economy by providing useful information for stakeholders.

03 **Call for collaborative actions by the public and private sector to make data available** and to flow for beneficial use, as data is an enabler and connector of value creation across organizations, industries, and sectors, Data policies need to be implemented with a stronger commitment at national and EU-level to fair data economy development.

ANNEXES

ANNEX 1.

Key challenges and bottlenecks for promoting the data economy identified in the roadmap process

Challenge	Description
Lack of awareness of opportunities	General awareness and understanding of the data economy in Finland is insufficient. The data economy concerns everyone, but this is not yet well understood. The different data economy projects are not aware of each other, leading to a lack of a common situation awareness.
Limited data mobility	Public sector and large companies are hesitant to share data for business reasons or because of legal uncertainty. This results in limited access to data and difficulty in sharing.
Lack of skills, resources, innovation, and attitude	SMEs lack resources, skills, attitude and courage for innovation. Data solutions are mainly developed for efficiency benefits, and good data experts are hard to find.
Regulation and compliance	Legal interpretations, for example regarding GDPR, are very cautious. Regulation concerning data use is fragmented and partly contradictory. Regulation should be fairer and more balanced.
Investments	Investments in data infrastructures and especially in soft infrastructures (capabilities, agreements, operating models etc.) are poorly understood and measured (ROI) compared to investments in physical capacity (networks, facilities etc.)
Fragmented infrastructure	Current infrastructure is fragmented and needs to be more unified, with the user at the center, and not based on services or technology.
International cooperation and competition	Access to large data masses is limited, and progress at the EU level is slow.

ANNEX 2.

Complete list of current roadmap actions in focus areas with responsible organizations

Challenge	Description
Human-centered services	Using data to curb energy use, call for solutions (Sitra)
	Better care and well-being from social and health data, report and recommendations (Sitra, Knowledge Broker ltd)
	Digitization and automation of life event service packages (Ministry of Finance, Government Digital office, Digital and Population Data Services Agency)
Business transformation	An operating model for creating innovative data ecosystems and business (Sitra with innovation ecosystems CAAS, SIX and SEEDS)
	Data accelerator (DIMECC, FAMN, Technology Industries, Silo AI)
	SMEs' data business growth and expertise program (TIEKE Information Society Development Centre)
	Sector-specific digital compasses for the green transition (Finnish Textile & Fashion Association, Chemical Industry Association, Service Employers, Technical Research Center of Finland VTT)
EU advocacy	Using data to curb energy use, call for solutions (Sitra)
	Data Strategy 2.0, inputs for the forthcoming European Commission Work Program 2024 (Sitra, European Policy Centre)
Skills	Basics of Data Economy: Self-learning and course materials on EU data regulation and its opportunities (Sitra, Finnish Institute of Public Management, Legal Tech Lab of University of Helsinki)
	Fair data economy learning materials (Finnish National Agency for Education, Sitra)
	Data economy expertise for influencers and decision-makers (Sitra, Ministry of Finance, Directors Institute Finland, Ministry for Foreign Affairs)
	Data skills training network (Aalto University with other universities and universities of applied sciences)
Infrastructure	City 3.0—Data ecosystem for energy optimization of the built environment (Construction Information Foundation, Sitra)
	Data economy tools in health sector ecosystems, funding call (Sitra)
	Nordic digital single market area, data space trials (Ministry for Foreign Affairs, Ioxio)
	Transport data ecosystem use cases (Fintraffic, Traficom, members of transport ecosystem)
	Data economy actions as part of the Digital compass (Ministry of Transport and Communications)
	Digital product passport pilots in the textile industry (Sitra, Finnish Textile & Fashion Association, VTT Technical Research Center of Finland, Ioxio, Technology Industries)
	Sitra Lab change program to accelerate web 3.0 experiments (Sitra)

ANNEX 2.

Complete list of current roadmap actions in focus areas with responsible organizations

Challenge	Description
Investments	EU financing and instruments development (Ministry of Economic Affairs and Employment)
	Data Economy program accelerating data economy development (Business Finland)

ENDNOTES

1 Sitra. 2021. "Roadmap for a fair data economy." Sitra. https://www.sitra.fi/en/topics/roadmap-for-the-data-economy

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16 In addition, to support those involved in the negotiations on forming the national government in spring 2023, the network listed inputs for reforming the Finnish economy with data.

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