# National view on research infrastructure development work

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# Trends in data management and scientific computation

*Suomi Finland 100*

## The importance of high-performance data analysis is growing

- The number of measurement data and data sources is increasing
- Data is used more and more in research, service and product development
- More and more complex research issues place greater demands on the data analysis environment

## Value-added analytics in all disciplines

- Artificial intelligence applications such as machine learning and robotics
- Applied computational methods in human sciences
- New breakthroughs in traditional data analysis disciplines

## Increasing data volume requires an evolving hardware environment and new methods

- Research and simulation data production accelerates
- The use of sensitive data and personal-based knowledge in research is growing rapidly
- The role of the IAA management of research material is emphasized

## User-friendly data-analytic environment

- Cloud Services
- Graphical user interfaces
- E-services and automation reduce routine work and bureaucracy

*Source: Material produced by CSC for the steering group of the Data Management and Scientific Computing Development Program, August 2017.*

# Some ongoing work at MOEC related to the national research infrastructure development

> » **Already existing**

- Finland's Strategy and Roadmap for Research Infrastructures 2014–2020

    ==> Digital Preservation Infrastructure (DIPI) also known as KDK-PAS and Tutkimus-PAS

> » **Recently started**

- National Current Research Information system 2020 also known as Tutkimus-VIRTA
- Data Management and Scientific Computing Development Program 2017-2021

> » **Vision work**

- Vision for higher education and research in 2030
- Research and Innovation Council vision and roadmap to 2030

# Digital Preservation Infrastructure (DIPI)

- The DIPI infrastructure has a primary objective to efficiently promote FAIR principles and optimal management and use of research data and digital cultural heritage, noting key constraints such as data protection and economic limitations.
- Described in several existing architecture plans (NDL, OS&R) and more to come
- Also educational and administrational materials can be included here.

# National Current Research Information system 2020 also known as Tutkimus-VIRTA

- Scientists do not need to enter their data into multiple systems.
- Collected metadata is aggregated in one place in the national data store.
- Permanent tags for both researchers and outputs make it easier to automate data transfer utilizing the researcher's own data in various services.
- The information is open to reuse, for example, in electronic services.
- The user of the data does not have to build a data link separately for each source system (eg from the RFO to each RPO).
- Organizations get comprehensive, up-to-date and consistent comparative research information at national level.
- Common information enables a view on research in Finland, thus improving the preconditions for the use of research data and social research impressiveness.

# Data Management and Scientific Computing Development Program 2017-2021

- Invest in data management and computing infrastructure and related services
- Upgrade infrastructures to the level required of international cooperation
- Improve research and education services (including state research institutes)
- Implement the digitalization goals outlined in the Government Program
- Observe the development of the European Research Infrastructure Policy
- Support the public administration and business life by raising the level of expertise and skills
- Altogether 35 M€ for the development program, in addition the volume of the yearly contract between the Department of Higher Education and Science Policy and CSC in this regard is 10,5 M€.
- Upcoming seminar in 13th of November to identify skill gaps and service needs

# Vision for higher education and research in 2030

- Minister of Education Sanni Grahn-Laasonen has launched a process for creating a vision for the Finnish higher education and research in 2030. The vision will be drawn up in broad cooperation with higher education institutions and other stakeholders. A parliamentary monitoring group supports the work.

- The purpose is to formulate a future scenario which enables the development of a high-quality, effective and internationally competitive higher education system in Finland by the year 2030. In the course of this work, different alternatives and models for improving the Finnish higher education system will be examined and their impacts and feasibility assessed. The development needs of the Finnish higher education and research will be reviewed and the future desired state defined on the basis of the changes in the national and international operating environment.

# Research and Innovation Council vision and roadmap to 2030

- Vision: Making Finland the most attractive and competent environment for experiment and innovation
- Achieving the vision requires common determined measures to ensure sufficient competence base and promote competence platforms, growth ecosystems and internationalization.
- Selected highlights:
  - **Target for the Government:** Support cross-sectoral RDI activities with public funds and promote openness of science on several fronts
  - **Short term target:** Finland's forerunning in open science and research increases the attractiveness of the RDI environment
  - **Long term target:** Private sector inputs are increasing for their own RDI and for public sector RDI actors ==> 4% of GDP

# ENSURING THE KNOWLEDGE BASE

**The level of expertise increases, competence and need meet**

**Effectiveness and compilation of RDI resources**

**Cross-border R & D and training**

**Education, participation and relevance to Finland's strengths**

## DEVELOPMENT OF KNOWLEDGE PLATFORMS AND GROWTH ECOSYSTEMS

**Enabling public administration**

**The knowledge platforms are accelerating new solutions**

**Innovation partnerships and ecosystems revitalize the economy**

**Data and artificial intelligence as drivers of the platform economy**

## INTERNATIONALITY AS A PREREQUISITE FOR QUALITY AND EFFECTIVENESS

**Finland's attraction is stronger**

**Mobility is a habit**

**Finnish players redeem their place in global networks**

# PROCEDURES FOR STRATEGIC CHOICES

*Suomi Finland* **100**

# FINLAND THE MOST ATTRACTIVE AND COMPETENT ENVIRONMENT FOR EXPERIMENT AND INNOVATION

# Finland is the world's…

- Best in Press Freedom (Reporters without Borders, World Press Freedom Index 2015)

- Least Fragile State (Fund for Peace, Fragile States Index 2014)

- Best in Wireless Networks per Capita (OECD, Broadband Portal 2014)

- Second Best Place to be a Mother (Save the Children, State of the World's Mothers Report 2015)

- Second Best in Gender Equality (World Economic Forum, Global Gender Gap Report 2014)

- Third Least Corrupt Country (Transparency International, Corruption Perceptions Index 2014)

- Fourth Most Competitive Country (World Economic Forum, Global Competitiveness Report 2014)

- Fifth Best in Education (Economist Intelligence Unit for Pearson 2014)

- Sixth Happiest country (Sustainable Development Solutions Network, World Happiness Report 2015)

- Best Country (Newsweek 2010)

- Top-ranking Country in PISA

# Knowledge triangle



Innovation

Science and Research

Education

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