



CSC – IT Center for Science

Sustainability report

2023

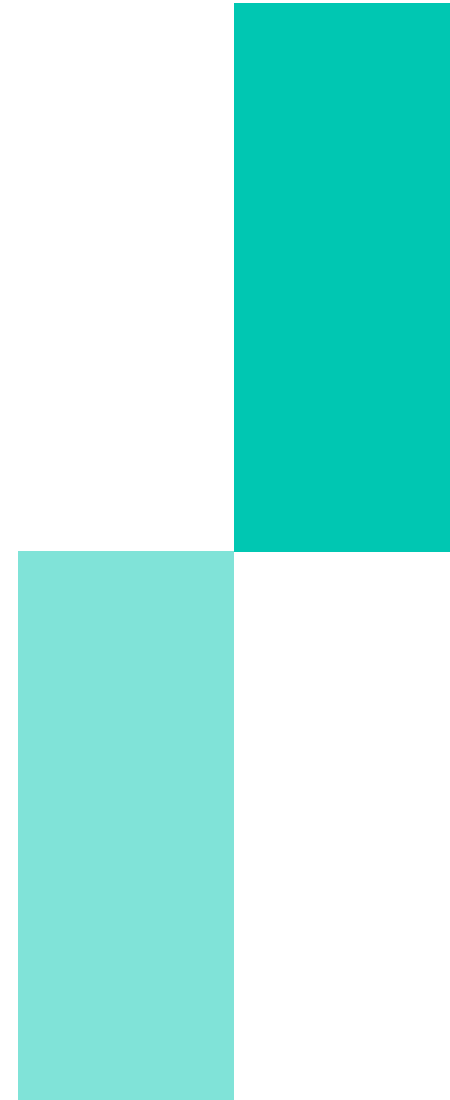


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Sustainability at CSC



Managing Director's review

As a company entrusted with special state assignment, CSC is uniquely placed to make a positive impact on society from the perspectives of both social and environmental sustainability. We launched determined efforts to develop our sustainability work in 2023. We listened to our stakeholders and identified the most essential sustainability themes for us, as well as the risks and opportunities associated with them. We are currently building a comprehensive sustainability programme and developing our reporting. Our aim is to minimise our footprint and maximise our positive handprint. First and foremost, we are doing this together with our customers and partners.

The first operating year of the European LUMI supercomputer has been a success. Its resources were widely used for research, including the development of digital twins for the Earth and research into open language models. Companies have used LUMI for their research and product development. LUMI offers us an excellent way to support cooperation projects involving companies and higher education institutions or research institutes.



LUMI has received international recognition for its environmental friendliness. The use of waste heat from LUMI in Kajaani's district heating network significantly reduces the local energy company's CO₂ emissions. We also joined the Climate Neutral Data Center Pact, which promotes international cooperation in the field of ecological data centers.

The demand for sensitive data services increases, and we develop the services based on customer feedback. Last year, we responded to researchers' need to process and analyse sensitive data as part of high-performance computing.

We supported higher education institutions' (HEIs) digital transformation through both the Digivision 2030 programme and the digital services we provide to HEIs. We were once again selected as Digivision's service integrator, a role which we hope to renew in 2024.

Artificial intelligence and data analytics are increasingly used in both research and public administration. We are also developing our capabilities in this field and, for example, have completed analytics experiments

and provided expert support for the Digital services for continuous learning programme.

The prolonged war in Ukraine and the escalating crisis in the Middle East towards the end of the year increase the fragility of the security environment and exacerbate hybrid influencing that targets Finland as a NATO member. While in general the cyber risks have heightened, no significant risks materialised in our operations. We actively develop information security and preparedness for cyber risks in cooperation with our customers and stakeholders.

Our growth continued in 2023, measured both in terms of business and personnel numbers. We are developing our facilities to respond to changes in the personnel's modes of work. In summer 2023, we signed a project agreement and lease with Varma Mutual Pension Insurance Company on a site in Keilaniemen Portti, which will be completed in 2026 and certified in compliance with two standards, BREEAM and WELL. The main criteria for selecting the new site were its sustainability aspects, adequacy of facilities, completion schedule, and cost-effectiveness.

A competent and thriving personnel is of paramount importance for an expert organisation. Last year, we were awarded a Finland's Most Inspiring Workplaces certificate for the third time in a row, proving that our investments in personnel well-being have been successful. This work is something that we will continue in the future as well.

Kimmo Koski
CEO

Sustainability management

Double materiality analysis lays the foundation for sustainability work

Sustainability underpins all business activities of CSC, and the objectives of the sustainability programme are embedded in CSC's business strategy. These goals guide both internal processes and work with customers. Setting ambitious goals, working together to achieve them and reporting on the results transparently are the guiding principles of CSC's sustainability work.

Sustainability has always been part of CSC's values. In 2023, CSC launched systematic work towards a more sustainable organisation. While this is a requirement under the forthcoming EU Corporate Sustainability Reporting Directive, CSC as a company entrusted with special state assignment, wishes first and foremost to set an example as a responsible business.

CSC completed a double materiality analysis of the key sustainability themes for its operations in 2023.

As part of the materiality analysis, representatives of CSC's key stakeholders were interviewed to ensure that their expectations regarding CSC's operations were addressed.

In workshops organised as part of the materiality analysis, CSC's experts, managers and directors came together to identify key sustainability themes and to assess the impacts, opportunities and risks of CSC's operations.

The materiality analysis identified seven sustainability themes that are the most essential for CSC:

- own workforce
- consumers and end-users
- climate change
- ethical business
- biodiversity and ecosystems
- resource use and circular economy
- workers in the value chain

CSC's sustainability work will have a particular focus on these themes, as they are the ones CSC is best placed to influence through its operations. The materiality analysis also identified them as the most essential sustainability themes in terms of CSC's core activities, external risks and opportunities alike.

Sustainability programme creates a framework for sustainability

CSC worked actively on its sustainability programme in 2023 on the basis of the materiality analysis results. The sustainability programme is built on three different levels. The highest level describes CSC's contribution to and positive handprint on society, especially through providing support for research and education. The core describes the way in which CSC looks after the environment and its personnel. CSC's foundation, or ethical business, guides all operations of the company.

Our work on the sustainability programme will continue. As part of this programme, we will select

objectives, goals and indicators for sustainability work as well as determine the measures needed to achieve the goals. We will then start communicating more widely about the goals of our sustainability work and the concrete measures for achieving them. It is important for CSC to engage both stakeholders and our personnel in promoting sustainability at CSC.

CSC's Board of Directors monitors the management and realisation of sustainability as well as risk management following its rules of procedure. Sustainability management and the coordination of practical procedures take place through CSC's routine [management system](#).



Our sustainability programme



Our contribution



CSC for research and education

We enable impactful research, innovation and digitalisation for higher education, research and cultural organisations by providing access to data, tools and expertise.



Our core

CSC for our planet

We minimise our environmental footprint throughout the value chain, improve resource efficiency, and promote the circular economy.

CSC for our people

We ensure our personnel's holistic well-being, embed diversity and inclusion in our culture and practices, and enable continuous learning for our employees.

Our foundation

CSC for ethical business

We uphold high standards and good corporate governance. We expect our partners and suppliers to commit to the same values. We ensure compliance, data security and privacy and foster transparency.

Operations, services and sustainability are developed together

Open and active interaction with customers and other stakeholders is particularly important for CSC's operations. Through dialogue, stakeholder relations can be strengthened and the expectations and wishes placed on CSC understood, enabling to respond to them better together.

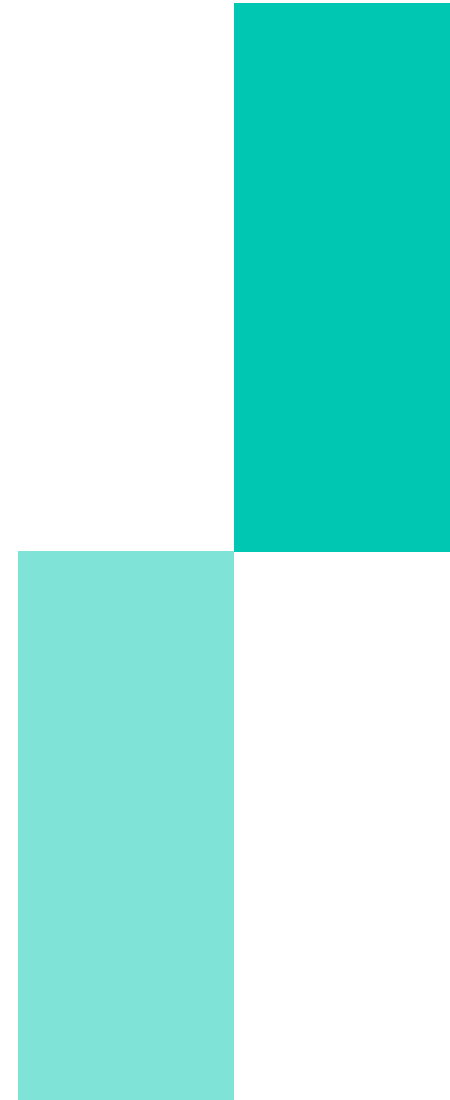
CSC's customers are also CSC's owners: the Finnish government, universities of applied sciences and universities. The Finnish government is the main owner of CSC and its largest customer. In particular, the Ministry of Education and Culture and its administrative branch, government research institutes, cultural and memory institutions and, to a more limited degree, other public administration organisations are customers with a bilateral relation with CSC. Higher education institutions are also CSC's owners, customers and partners. Their customer relationships with CSC are mainly organised through consortiums. As an in-house company of the government and higher education institutions, CSC provides other customers limited services that are relevant to the objectives of the government and higher education institutions.

CSC's service and development activities rely on strong customer interaction and doing things together. Cooperation with customers is the most important driving force in the development of a new service and throughout its life cycle. Customers are also important partners of CSC in external competitive funding projects.

Customer satisfaction is surveyed not only as part of the interaction but also through regular surveys and interview studies. In connection with the double materiality analysis, representatives of customers and owners were interviewed. As part of T-Media's Reputation&Trust analysis, CSC commissioned interviews on jointly identified strategic themes with the heads of higher education institutions and directors of research institutes. Feedback is also collected annually in the steering groups of research institutes' and higher education institutions' framework agreements, from the end users of data management and computing services and, if necessary, the contact persons of the services.



CSC for ethical business



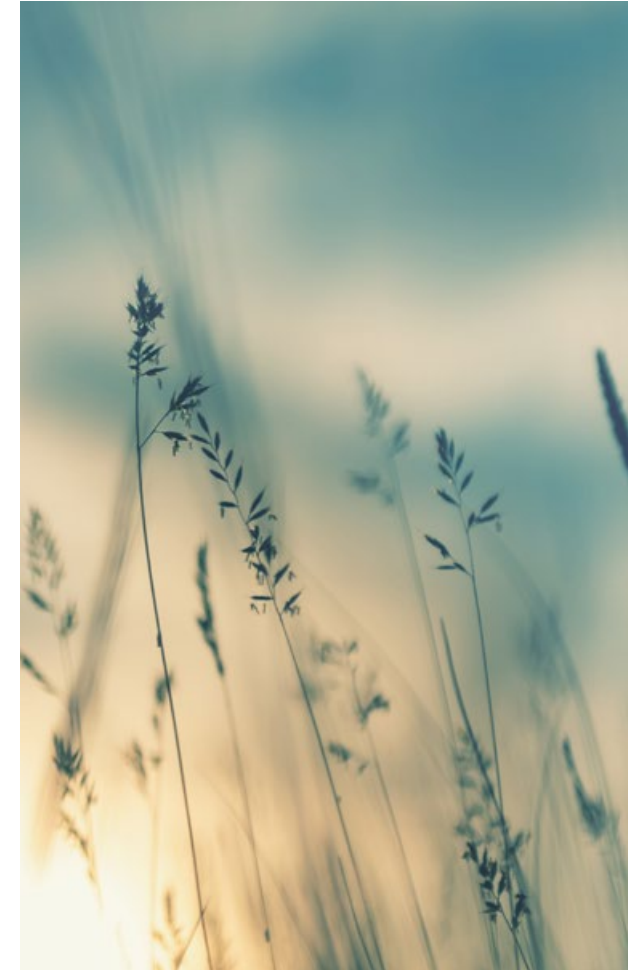
Transparent financial management

CSC's mission is to provide non-profit services to its shareholders. Rather than operating on market terms, CSC provides services in the business areas and to the organisations specified by our shareholders, as stated in our Articles of Association. At CSC, financial responsibility means transparent financial management and the provision of high-quality yet cost-effective services.

Financial objectives and their attainment

The financial objective set for 2023 was streamlined and cost-effective management. As anticipated, increasing cost levels and inflation made 2023 a challenging financial year. CSC's business continued to grow, creating economies of scale. Cost-efficiency remained well under control, despite the relative increase in cost levels. Efficiency was sought from structural changes and various savings measures.

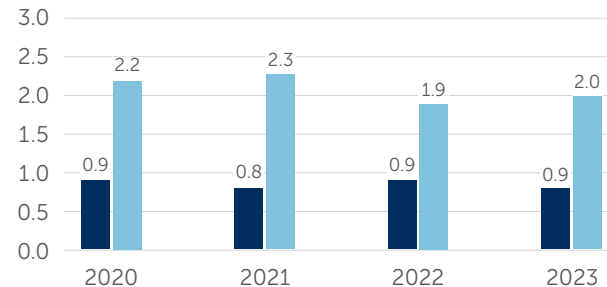
Year 2023 was satisfactory in terms of CSC's finances. The company's business developed more or less as predicted, and the financial objectives for the year were mainly achieved. We were able to respond to changes in the operating environment by developing the company's internal and external functions, including more efficient use of premises, focus on personnel's career rotation and active management of resources. New customer relationships and international projects accounted for a significant share of business growth. The cost-effectiveness of CSC's operations remained at a good level. For more detailed key figures of CSC's financial performance and economic activities, see the Annual Report, Financial Statements and Auditor's Report.



Cashflows to stakeholders

Cashflows to stakeholders	2023
Net sales	73.563 M€
EU, Business Finland, Finnish Academy fundings	15.976 M€
Other operating income	0.105 M€
Suppliers	-40.567 M€
Personnel	-45.768 M€
Public sector (taxes)	-5,000
Non-profit organizations: grants and donations	0
Shareholders	0
Financial expenses	-10,000
Financial incomes	203,000
Financial profit	-0.560 M€
Investments: depreciation	4.057 M€

Liquidity ratio

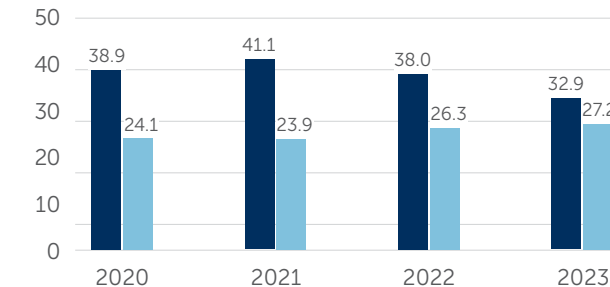


■ Current Ratio*
■ Quick Ratio**

* Current Ratio: More than 2 = good, 1-2 = satisfactory, less than 1 = poor

** Quick Ratio: More than 1 = good, 0.5-1 = satisfactory, less than 0.5 = poor

Solvency ratio



■ Equity ratio-%*
■ Debt ratio-%**

* Equity Ratio: More than 40% = good, 20-40% = satisfactory, less than 20% = poor

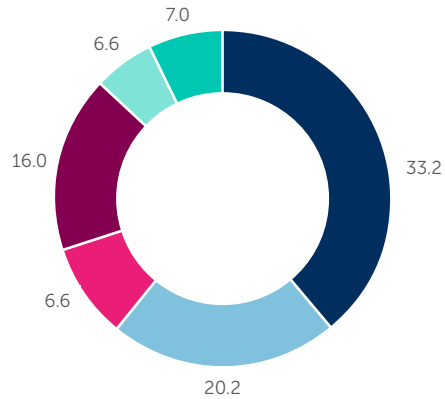
** Debt Ratio %: More than 80% = poor, 40-80% = satisfactory, less than 40% = good

Financial support from the state in 2023

Financial support from the state	€	€/000
Special state grant	7,127,054.06	7,127
Investment aid	223,119.00	223*

* Includes also money for the DL2026 investment.

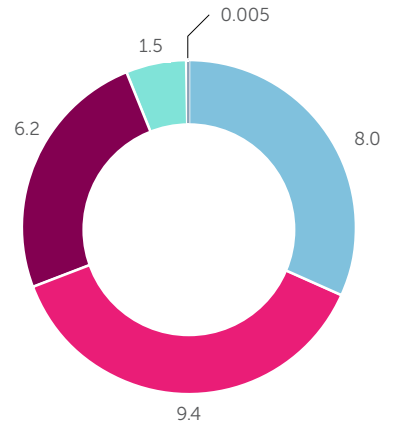
Revenue EUR million



- Ministry of Education and Culture, 37%
- Higher and other education, 23%
- Public administration organisations, 7%
- Financers, 18%
- Research organisations, 7%
- Culture organisations and others, 8%

In 2023, CSC had a total revenue of EUR 89.6 million.

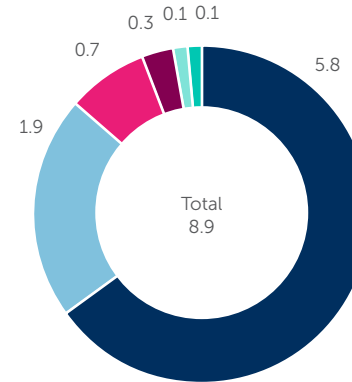
Tax footprint EUR million



- Corporate tax, 0.02%
- Value added tax, 31.88%
- Withholding taxes on pay, 37.51%
- Employee pension payments, 24.75%
- Other statutory contributions related to personnel, 5.84%

In 2023, CSC's tax footprint amounted to EUR 25.0 million.

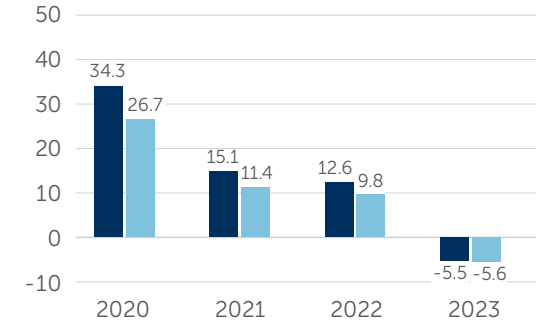
Distribution of RDI project funding by financial instrument in 2023 EUR million



- European Commission, 65%
- Academy of Finland, 21%
- NeIC, 8%
- ERDF, 3%
- ELIXIR Hub, 2%
- Other, 1%

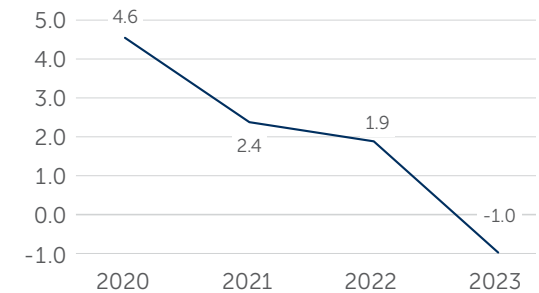
CSC participated in 82 projects. In addition, CSC is involved in EuroHPC JU LUMI Consortium (9.4 M€).

Return on capital



- Return on investment - %
- Return on equity - %

Operating profit, %



Information security and data protection

Developing information security and preparedness

In general, the cyber risks in CSC's operating environment increased in 2023 due to such factors as the war in Ukraine and heightened international tensions. No significant risks materialised in CSC's operations, however.

CSC worked actively together with customers and other stakeholders to mitigate the increased risk level and to develop security. An example of this development is the new Funet CSOC information security service, the launch of which was prepared together with the higher education institutions. CSC has also monitored the evolution of cyber security and risk management regulation. The company has launched a project aiming to develop capabilities relating to information security and preparedness.

In 2023, CSC once again renewed the highly valued international ISO/IEC 27001 certification for the company's information security management system and extended its scope to include the following: Data center activities, ICT and computing platforms, IaaS cPouta and ePouta, Digital Preservation Service, SAPA platform, Eduuni and Tiimeri cooperation platforms,

LUMI hosting and Funet Miitti services in Espoo and Kajaani.

CSC provided regular information security training for its personnel and organised an internal information campaign on key topical security themes towards the end of the year. CSC's management group has established a dedicated steering group to oversee the development and management of cybersecurity and data protection. Additionally, CSC's management group regularly reviews security and data protection.

Capabilities for data protection management

CSC complies with the General Data Protection Regulation and is committed to processing personal data carefully, in compliance with applicable laws and regulations, and making sure that individuals' right to privacy is respected and secured. In 2023, CSC was able to allocate more data protection resources to not only daily advice and guidance provision but also the development of internal processes and operating methods. For example, CSC improved the efficiency of the completion and updates of data protection documentation for its services and developed the data protection impact assessment process.

Several information sessions on key data protection processes were organised for the personnel and, where necessary, targeted workshops were held for different units. A data protection seminar intended for all staff members was organised in December.

Efforts to develop data protection reporting were also launched in 2023. During the year, real-time reports were prepared for the use of responsible directors and managers on the status of data protection documentation associated with their services. The reporting and indicators relating to data protection will be developed further, with comprehensive reporting on the organisation's data protection compliance as the aim.

In late 2023, CSC conducted a survey on the personnel's data protection competence and needs. This survey was carried out for the first time in 2022, and compared to the previous year, the results had improved in almost every question. The only questions in which a small drop was registered concerned identification of responsibilities and support from the data protection team, and these issues will be addressed over the next year.

Responsible supply chains

CSC adheres to both its own procurement guidelines and the Act on Public Procurement and Concession Contracts (1397/2016). Procurements are also governed by case-law relating to the Act on Public Procurement. Additionally, CSC complies with other legislative requirements in its procurements, including the Act on the Openness of Government Activities and, as required in each individual case, also with the General Data Protection Regulation and the Act on the Contractor's Obligations and Liability When Work is Contracted Out.

Minor procurements that do not fall within the scope of the Act on Public Procurement are put out to tender following CSC's procurement guidelines. CSC aims for fair treatment, long-term contracts and open cooperation in procurement. All suppliers are expected to comply with CSC's Code of Conduct.

CSC continued to develop its procurement activities in 2023. The aim of these efforts is to secure sufficient resources for managing CSC's procurements and developing the procurement activities. During the year, CSC continued to implement its procurement strategy, especially by improving procurement category management and the availability of procurement information.

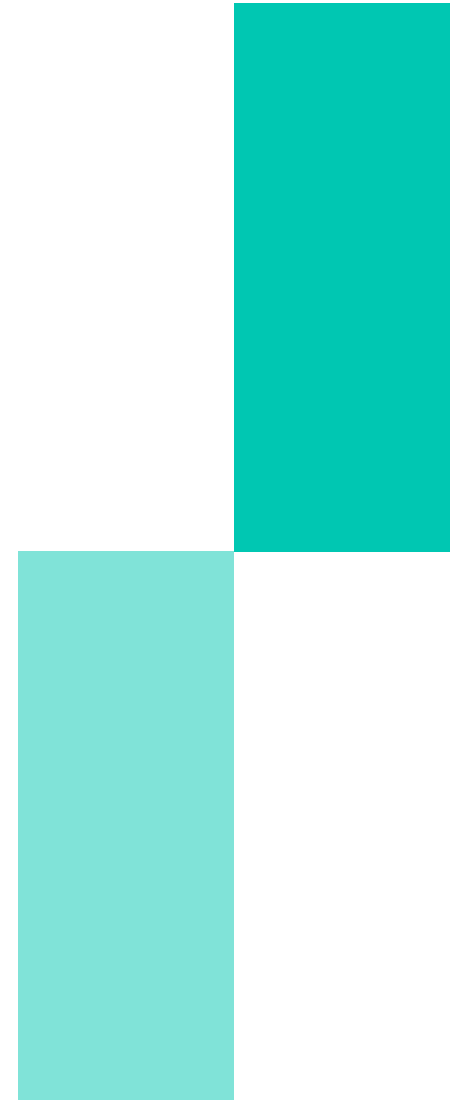
Unless there is a particular reason not to do so, CSC always uses Hansel Oy's framework agreements, which address environmental issues. CSC's procurement guidelines instruct those making purchases to examine environmental factors over the full life cycle of the product or service. CSC includes any information security requirements relevant to the object of the procurement in its calls for tenders. Procurement contracts, and particularly those for IT services, software and hardware, contain a separate appendix on security. If, as part of a procurement, personal data processing is outsourced to the service provider or the service provider acts as the controller when providing the service the procurement contract concerns, the requirements laid down in the Data Protection Act are complied with.

One of the major development areas in procurement processes in 2023 was creating and developing practices related to checking for sanctions. The applicability of sanctions is checked for every supplier before the procurement contract is signed. This applies to all procurements, both low-value ones and those that exceed the national threshold value. In procurements relying on Hansel Oy's framework arrangements and in internal procurements made within dynamic purchasing systems, these checks have been carried out by Hansel Oy.

Focus on sustainability in the search for new premises

For the past few years CSC has been investigating ways to develop its facilities in step with the changing working modes of its growing personnel. In late 2022, CSC conducted market research together with real estate consultants CBRE to find suitable sites in the Keilaranta-Otaniemi area that would be available as the current lease expires at the end of 2026. Examination of short-listed sites was continued based on a preliminary study and, following a tendering process, real estate consultants JLL Finland was selected as the expert to carry out the requisite technical comparison and put the project out to tender. Following negotiations conducted in the winter and spring, Keilaniemen Portti site was selected as the property that best meets CSC's needs in terms of its features, price and ecological aspects. A lease for 2026–2036 was signed with Varma Mutual Pension Insurance Company in June 2023. The property will be certified according to two standards, BREEAM and WELL. Law firm Bird&Bird assisted CSC in finalising the details of the lease.

CSC for our people



Personnel

Personnel policy, wellbeing at work and key figures

For employees in expert roles, mental work ability plays a key role in motivation and coping at work. Well-being at work was one of the themes of CSC's Leadership Development Program. Coaching focusing on work ability management was organised for those in managerial roles. The personnel's well-being at work was supported with cultural, sports and lunch benefits as well as recreational afternoons organised in spring and autumn. The personnel are offered extensive and versatile occupational health care services as well as health security and remote work insurance with a wide coverage.

At the end of 2023, CSC had 660 employees, 90% of whom had an employment relationship valid until further notice. The number of employees increased by 93, or 16%, year on year. Personnel turnover was 5.9%, and the average employment relationship duration was approximately 7 years. The accident frequency was 6.96. At the end of 2023, 37% of the personnel were women and 63% men.

The number of higher education students who worked as trainees with CSC in summer 2023 was 54, which

was a new record. The Summer Xperience programme for trainees was organised for the sixth time to support a smooth traineeship experience and to promote a feeling of communality. CSC's cooperation with higher education institutions was strengthened in 2023, one aim of which was ensuring that our future competence needs can be met.

Responses to the personnel survey were received from 541 people, or 87.7% of the personnel. The PeoplePower® index based on multiple questions was 74.9 (on a scale of 0 to 100). Eezy Flow, the company conducting the survey, presented CSC with its 'Finland's Most Inspiring Workplaces' award for the third time. As CSC's particular strengths were seen investment in well-being, opportunities for learning and development, and the company culture and working atmosphere. The results of the personnel survey were examined and development plans were prepared at the group, unit and company levels.

The preparation of CSC's People Agenda began in 2023. It outlines key HR management themes on which CSC will focus in all units and groups. The planning of the HR Business Partner model was also

launched in 2023. In this model, a HR professional is appointed to the role of HR Business Partner in each unit to provide business-oriented support for supervisors in all matters related to HR processes and to ensure that progress is made with the jointly outlined HR management themes, processes and development measures.

Code of Conduct and equality

The CSC Code of Conduct describes the principles of personnel rights that are observed in all CSC's operations. In connection with their induction, employees complete online training on the 'Code of Conduct – Our way of working', and the Code of Conduct is also covered in the annual CSC discussions. The Code of Conduct is complemented by an internal equality and non-discrimination plan, which is reviewed and updated regularly.

Performance management, competence development and rewarding

Performance and target discussions, known as the CSC discussions, are conducted in the first quarter of the year to assess achievements during the previous period and to set targets for the next one. Personal

goals are set in line with the targets of the unit and the company. Personal development plans are drawn up in August or September. Target attainment and realisation of the development plan are monitored as part of continuous dialogue between employees and their supervisors.

Themes emphasised in coaching programmes on supervisory and leadership competence included developing competence in strategic management, customer relationships and value management, remote work management, self-management, work ability management and employment relationship legislation. Various themes of service management, project leadership and facilitation as well as online training relating to data protection and information security were emphasised in other personnel training.

The performance bonus procedure is part of CSC's incentive system, the aim of which is to reward the success of the company and of individuals. Other incentives include pay increases, career advancement, meaningful tasks and timely and encouraging feedback from supervisors and colleagues. The decisions on personnel bonuses and their grounds are made each year by the Board of Directors, which authorises the CEO to award the bonuses to the personnel.



Employees at the centre of work environment development

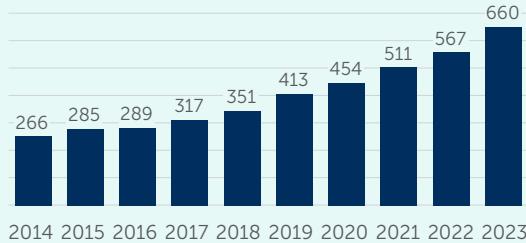
CSC launched a large-scale work environment development project in 2023 to improve CSC's attractiveness as an employer and to provide an efficient setting for working at CSC. The project develops the digital, social and physical dimensions of the work environment. As part of this project, CSC will move to its new head office in late 2026.

Focus on the employees is at the core of this project. The most important task of CSC's work environment is to support its experts' work. The work environment is being developed together with CSC's experts to ensure that it will meet their needs as well as possible.

Four priority areas have been identified for the work environment development project: a setting that supports efficient work, concentration and cooperation, well-being, and multi-locality. Sustainability is a cross-cutting theme of the development work. The priority areas of the development project address the employees' needs, CSC's strategy and values, and global trends in work and the work environment.

People 2023

Employees



Gender

♂
63%

♀
37%

Average employment length, years

7

Average age of retirement

64

Employee turnover

2014–2023, %

3.2–8.9

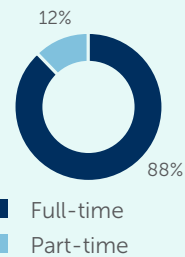
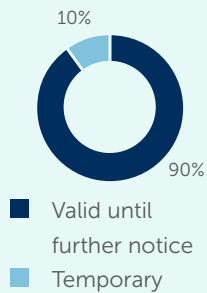
Absences due to illness average / person

7.4

Average age

42

Employment

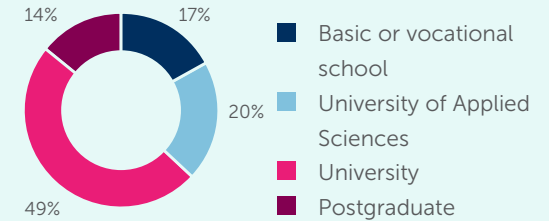


Training days

2014–2023 / person

0.7–2.1

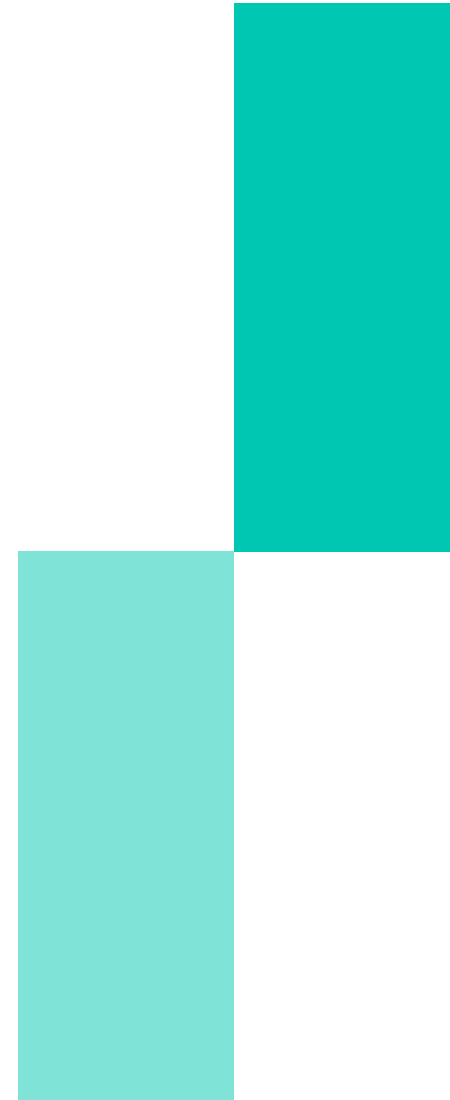
Education background



Citizenships represented in staff

29

CSC for our planet



Energy-efficient data centers

The utilisation rate of CSC's scientific computing and data management services for Finnish research is high. Efficient use of resources is ensured by such means as scalability tests. CSC's data centers in Kajaani have achieved world-class energy efficiency, meaning that energy is consumed in meaningful activities (Power Use Effectiveness, PUE value) and using the released waste heat sustainably (Energy Reuse Effectiveness, ERE value). In smaller data centers, energy efficiency is traditionally based on optimising primary electricity use, which means minimising additional energy consumption for cooling. Large units can be integrated into district heating networks economically and on the terms of production. While heat transfer requires extra energy, the re-use of waste heat brings significant ecological benefits.

LUMI data center built in an old industrial property has been operative since 2022, and the utilisation rate of the LUMI supercomputer reached full capacity in 2023. The waste heat from LUMI data center is used as carbon neutral district heating for the City of Kajaani and the industrial estate of Renforsin Ranta. LUMI supercomputer's ERE value, which measures the utilisation of waste heat, was excellent at 0.52.

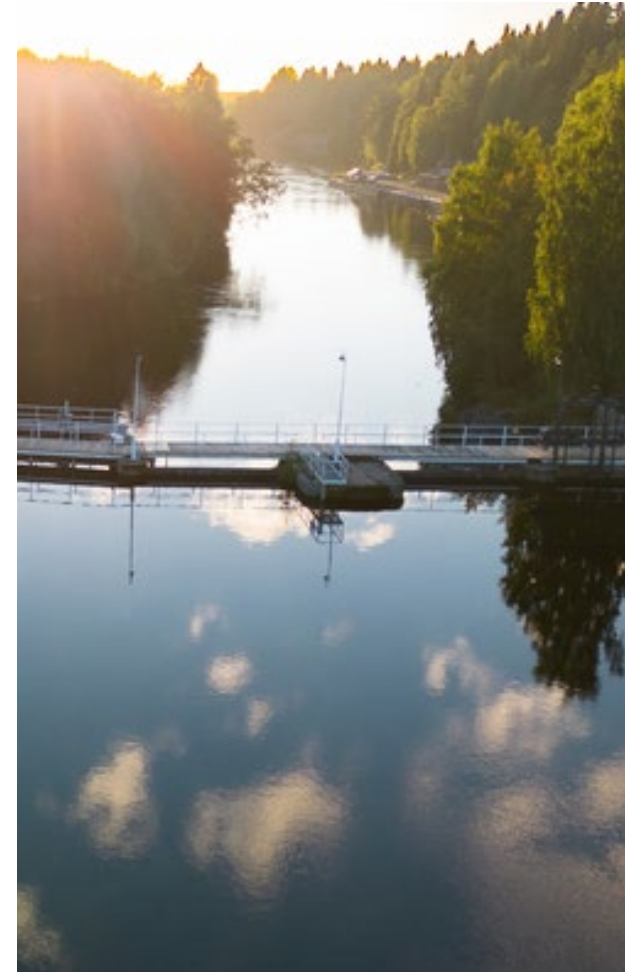
LUMI system runs exclusively on 100% sustainable hydropower.

The energy efficiency of CSC's other data centers, including the national data center and air-cooled data center modules, was also good during the production year. These data centers also only consume electricity from renewable sources, but their waste heat cannot be used for district heating production.

CSC will continue efforts to improve the eco-efficiency of its data centers. When selecting successors for the national supercomputers Mahti and Puhti, the focus is increasingly on energy efficiency issues, both in hardware selection and the design of an energy-efficient cooling solution, which will be integrated into the current ecosystem of Renforsin Ranta.

Energy and water

The largest electricity consumers in CSC's operations were the data centers, whereas the offices in Espoo and Kajaani accounted for less than 1% of the total consumption. All electricity used by CSC's data centers and offices was renewable. The district heating used on Espoo and Kajaani properties is emission-free.



CSC is not a major consumer of water. The company's data centers mainly use a closed water-cooling cycle, which minimises their water consumption. In free-cooling data center modules, water is mainly used for humidity control and emergency cooling.

Carbon footprint and handprint

The calculation of the carbon footprint factors in direct and indirect emissions generated from the operations in accordance with the Greenhouse Gas Protocol. Most of CSC's emissions come from indirect sources, on which information is not always available. Each year, CSC strives to obtain more specific information. The carbon footprint data concerning different years are consequently not yet comparable.

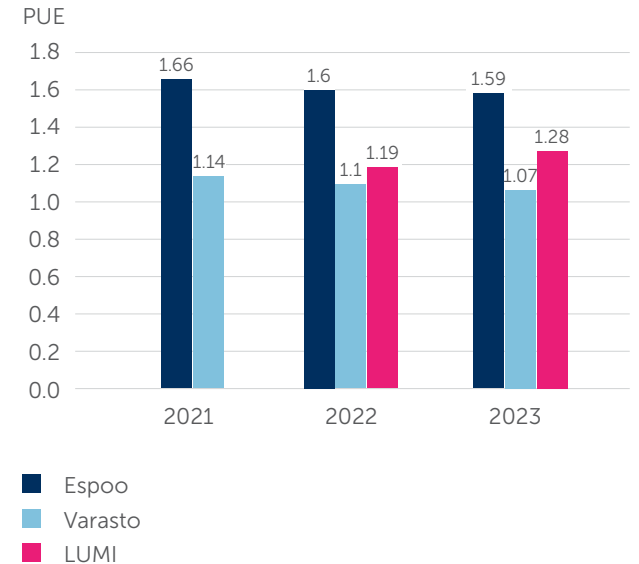
CSC reports its greenhouse gas emissions in three categories: the company's direct emissions (Scope 1),

direct emissions from purchased energy (Scope 2) and indirect emissions (Scope 3). The figures for 2023 also include an estimate of emissions from commuting for the first time.

CSC does not produce direct emissions, or have direct emissions from purchased energy. In 2023, indirect emissions were recognised from purchased energy, business travel, commuting and waste management. Their estimated total was 2,090 tCO₂-eq. CSC is developing the monitoring of indirect emissions from purchased services and products.

CSC's carbon handprint, which consists of using waste heat from Kajaani data center for district heating, amounts to 2,895 tCO₂eq.

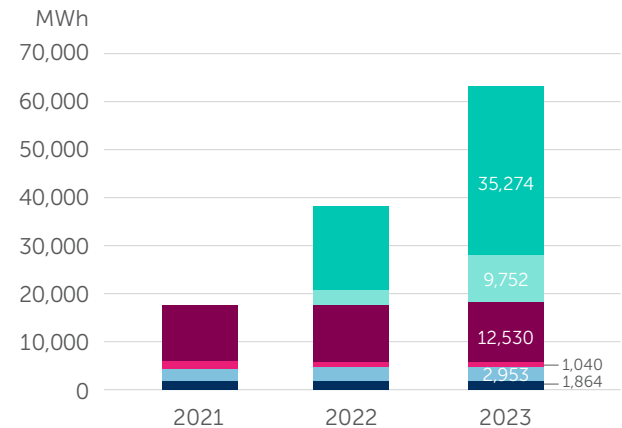
CSC's data centers' energy efficiency in 2021–2023



Waste volume from Espoo offices by waste category

Waste category	Energy fraction	Biowaste	Mixed waste	Cardboard	Recyclable paper from the office	Glass	Packaging plastic	Metal	Total
Waste volume (t)	10.09	7.78	6.78	5.24	3.50	2.11	0.91	0.84	37.25

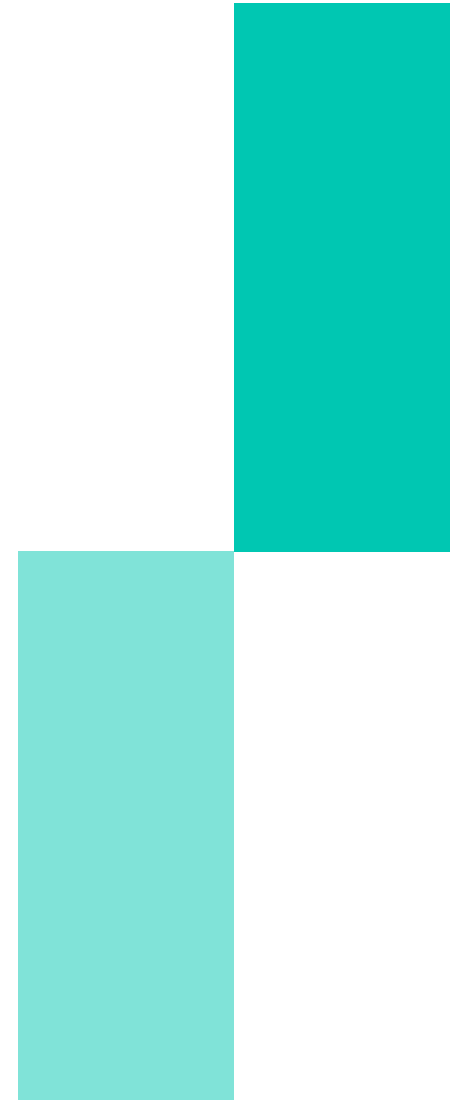
CSC's data centers' energy consumption in 2021–2023



- Espoo other
- Espoo IT
- Varasto other
- Varasto IT
- LUMI other
- LUMI IT



CSC for research and education



We create value

OUR CAPITAL

Our strengths are extensive cooperation and sharing of expertise

- Services steered by customers at all lifecycle stages
- CSC operates the Digivision 2030 project office for Finland's 38 higher education institutions
- Through our expertise, we support our customers' cooperations
- Extensive international and national networks

53

EU-funded RDI projects

57%

of the projects include a Finnish higher education institution or research institute

We enable research and education

- Digital operating environment for research, education and cultural heritage
- We are involved in European networks and ecosystems, including digital innovation consortiums (EDIC) and innovation hubs (EDIH) as well as dataspaces
- We have expertise in data analytics and AI methods

Data management and computing service ecosystem that meets users' needs

Reliable and secure environments

- Critical infrastructures, high resilience
- We are involved in the activities of the National Emergency Supply Agency
- We regularly practice preparing for cyber disruptions

ISO/IEC 27001 certificate from 2013

Sustainable data centers

- Use of waste heat from Kajaani's low-carbon data center in district heating
- We aim to address sustainability over the entire life cycle of our procurements

Carbon footprint **2,090** tCO₂-eq.

Carbon handprint (generated district heating) **2,895** tCO₂-eq.

We are an attractive employer

- Over 600 experts in different fields
- Multicultural and international work community
- Women account for 37%

Finland's most inspiring places to work award since 2020

PeoplePower Index **74.9**

We are a non-profit company entrusted with special state assignment

- Owners: State of Finland 70%, higher education institutions 30%
- Open and transparent financial management and operations

Turnover EUR **73.7** million

OUR PURPOSE

Together we build world-class environments for research, learning and innovation



OUR SUSTAINABLE DEVELOPMENT GOALS



WE CREATE VALUE FOR OUR OWNERS, CUSTOMERS AND SOCIETY

Impact of research gets stronger

Solutions for data-intensive computing

- 10,200 users of data management and computing services
- Willingness to recommend CSC's services among national users 8.7/10

Sensitive data environments

- Services for end users and organisation customers
- For processing, publishing and authorising access to sensitive data

Using LUMI supercomputer, we are involved in developing digital twins for the Earth and biodiversity

We promote the findability of research produced in Finland (Research.fi)

Our services enable using science in decision making

Our knowhow, networks and experts help to secure RDI funding for areas of national importance

Digital transformation is advancing

Services that make daily life easier in research, learning and teaching

- 1.2 million Funet-Miitti meetings
- 62,000 applicants took entrance examinations using solutions provided for higher education institutions by CSC
- We develop the Library of Open Educational Resources for the Ministry of Education and Culture: 3,000 sets of e-learning resources

We provide services based on data analytics and data hubs for decision making in different sectors

Safeguarding cultural heritage and research data sets: 27 digital preservation contracts

Together with our customers and partners, we develop critical technologies and new practices – examples include artificial intelligence, data analytics and quantum computing

Benefits from synergy are born

We promote service and data portability and interoperability

- National data management solutions (incl. Fairdata and DPS)
- Finnish University and Research Network Funet has over 410,000 users
- Haka identification provides access to 473 services; 59.4 million logins, approx. 330,000 end users

We share our expertise

- 147 training events, feedback average 8.5/10
- Learning resources for data management and using computational methods and tools
- Updated website serves customers and users better

Services provided by the international network (incl. ELIXIR, EUDAT, EOSC)

We offer secure and interoperable research environments cost-effectively

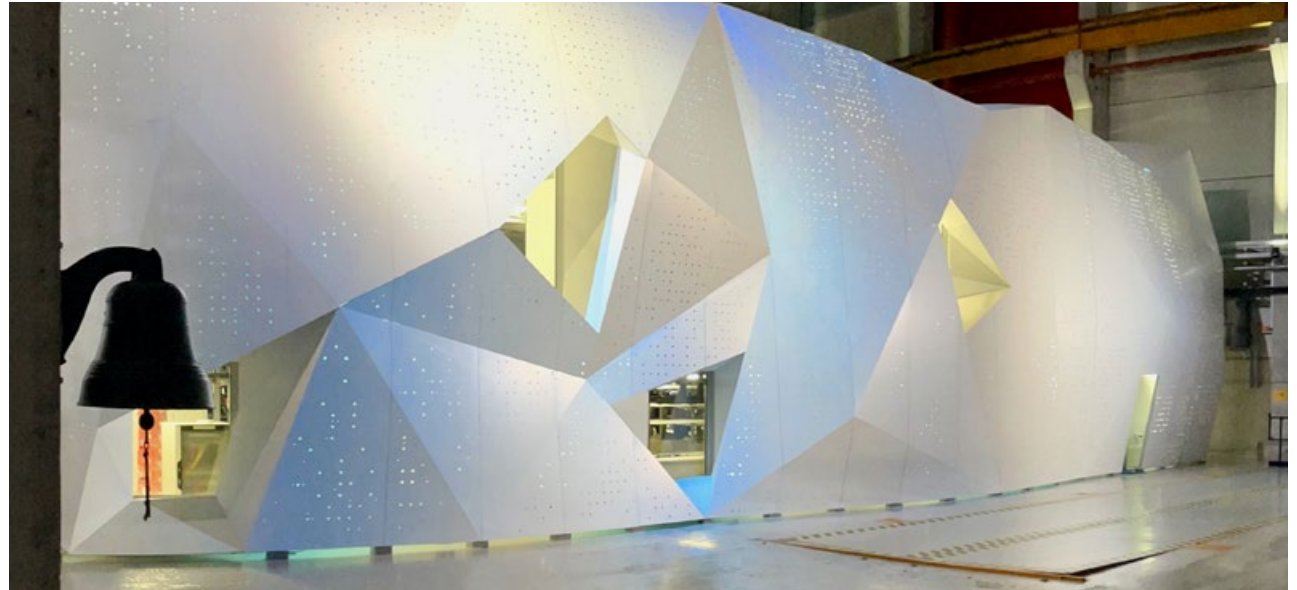
Influencing national and international operating conditions

CSC strives to influence the national and international operating conditions relevant to the company's business. Supporting the company's strategic goals is the starting point for this work. The aim is that CSC's knowhow, capacity and expertise can be used as widely as possible in society.

In 2023, CSC participated actively in EU consultations and commenting rounds on legislative projects, some of which also involved committee consultations or meetings with Parliament, ministries, the European Commission or European Parliament representatives. The most important EU consultations included the preparation of the EU Framework Programmes for Research and Innovation (Horizon Europe) and the Digital Europe Programme in cooperation with the national liaison officers of these programmes. CSC was involved in advocating viewpoints relating to research infrastructures, data management and computing, new technologies and interoperability that are essential for our customers in the principles of funding programmes and EU legislative initiatives.

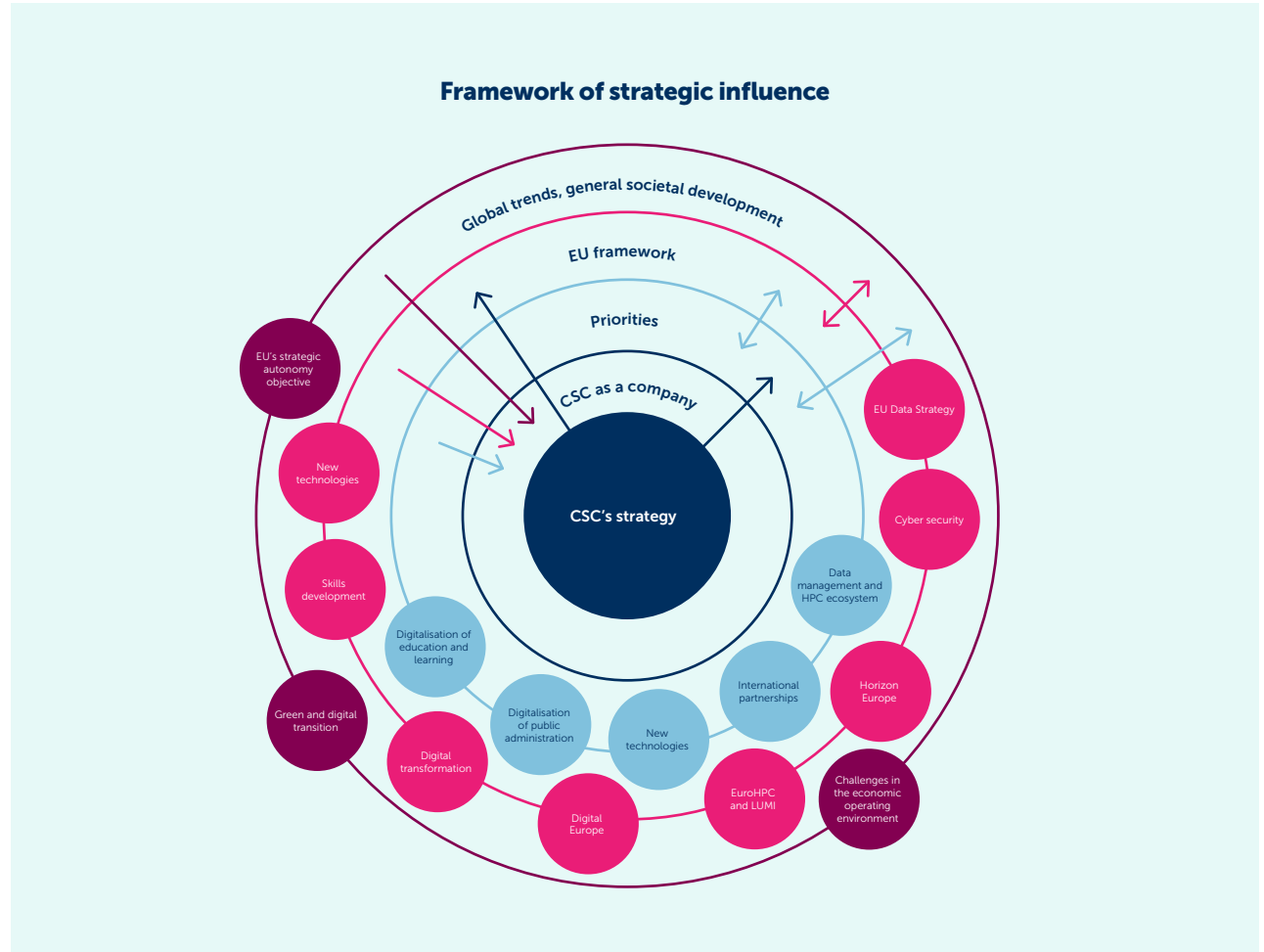
CSC's Kajaani data center and the LUMI supercomputer attracted a great deal of interest, and ministers, MPs and MEPs, officials of the European Commission and local EU actors visited the data center during the year. Hosting the LUMI

supercomputer in Kajaani raises international awareness of CSC and Finland as pioneers of the digital transformation, competence development, RDI, technology as well as green and energy-efficient data centers.



Year 2023 was additionally marked by active societal dialogue and stakeholder cooperation aiming to create a LUMI ecosystem for broad-based use in society as well as national and international collaboration networks.

CSC's public statements can be found online on the Statements page of the company's website at csc.fi/statements.



Impact of research gets stronger

Data management and computing infrastructures that are of a high international standard enable high-quality computational and data-intensive research. Designing services to be user friendly and easy to use is essential, as the user base of data management and computing services is expanding and diversifying. Local, national and international collaboration is vital in order to take advantage of the full potential of the infrastructures.

LUMI benefits research, companies and cooperation

The installation of LUMI's final phase was approved in November, and the supercomputer's huge capacity is now available to researchers and companies.

LUMI's unprecedented computing power is widely used in different fields of science. These projects include open language models that also promote the development of open and reliable European artificial intelligence, design of new, optimised vaccine products, and research in the emergence of solar storms.

LUMI ranked fifth on the Top500 list of the world's fastest computers published in November, and was the fastest supercomputer in Europe on this list for the fourth time in a row. LUMI's environmental friendliness is also in a class of its own and has received a number of international recognitions. CSC has a strong stake in international discussions on the sustainability of data center operations, including low carbon solutions and eco-efficiency perspectives.

Additionally, LUMI's easy-to-use, browser-based user interface was commissioned and now serves all LUMI users across Europe.

Article: Research group created the largest Finnish language model ever with the LUMI supercomputer

Article: Researchers discovered information from under the Sun's surface about the emergence of solar storms using the LUMI supercomputer

Videos: Watch the videos to see how LUMI promotes science in such fields as climate and cancer research.

[Follow news about LUMI](#)



CSC participates in developing digital twins

LUMI, one of the most powerful and advanced supercomputers in the world, plays a key role in efforts to develop digital twins for the Earth and biodiversity.

Destination Earth (DestinE)

The EU's [Destination Earth](#) programme develops digital twins for the Earth to support decision-making. The [Climate Adaptation Digital Twin \(Climate DT\)](#) project coordinated by CSC is developing a modelling system for assessing the impacts of climate change and finding adaptation strategies. Phase 1 of the project will end in April 2024, and negotiations on extending it are under way. CSC is also involved in the digital twin project for extreme weather events.

Biodiversity Digital Twin (BioDT)

[Biodiversity Digital Twin](#), a Horizon Europe project led by CSC, creates new ways of using digital twins and high-performance computing to model biodiversity. The project has made good headway, and the collaboration between CSC, the University of Jyväskylä and YLE within its framework in the national Spring of Migratory Birds programme was presented with the [Champion of Open Science 2023 award](#).

Nordic CryOSphere Digital Twin (NOCOS DT)

NOCOS DT, a project funded by the Nordic Council of Ministers, aims to explore and pilot the potential of digital twins technology in the cryosphere domain. More specifically, the project aims to show how outputs from the [Destination Earth \(DestinE\)](#) and [Climate Adaptation Digital Twin \(Climate DT\)](#) projects can be used in key sea ice impact sectors in the Nordic and Baltic contexts.

Advancing quantum computing in cooperation

The LUMI ecosystem enables CSC to engage in national and international cooperation aiming to advance quantum computing. CSC participates in the Finnish Quantum Flagship (QF) project led by Aalto University, which the Academy of Finland included in its flagship programme in 2023. The Finnish Quantum Flagship is building up the national ecosystem in this sector. Through LUMI, companies gained access to VTT's quantum computer, Helmi. The combination of LUMI and Helmi was already made available for higher education institutions and research institutes in the previous year as part of the Finnish Quantum-Computing Infrastructure (FiQCI). Year 2023 also saw the launch of cooperation aiming to build a European-wide environment that integrates high-performance and quantum computing, as well as efforts to set up a national quantum encryption network.

High-performance computing supports product development

Together with the Ministry of Education and Culture, the Ministry of Economic Affairs and Employment, Business Finland and Technical Research Centre of Finland VTT, CSC has developed ways of serving companies interested in using high-performance computing. Twenty per cent of the LUMI supercomputer's capacity has been set aside for businesses. Free Try&Buy test projects, in which companies can carry out small-scale experiments with LUMI with expert support from CSC, are an important instrument for marketing LUMI's potential.

The volume of business use has increased steadily. Companies have used LUMI in such areas as artificial intelligence, data analytics and computational fluid dynamics. Feedback from business users on the benefits offered by LUMI and CSC's expert support has been positive. Companies are interested in working together with higher education institutions and research institutes. CSC is drawing up a plan for using LUMI to promote and support cooperation between the public and corporate sectors.

A joint project between Silo AI and the University of Turku has created the largest fully open language models so far, which cover all the official languages of Europe.

[Read more](#)

Ramboll tapped LUMI's resources to simulate fire safety and speed up its design process.

[Read more](#)

The Finnish space technology company ICEYE, which manufactures satellites, used LUMI supercomputer's graphics processors in the product development of automatic image interpretation.

[Read more](#)

Solving common challenges through global research cooperation

Under a science policy decision made by the Ministry of Education and Culture, a project was launched to enhance the global impact of LUMI and to create opportunities for international cooperation for Finnish research groups. CSC's role is to coordinate the project and serve as a gateway to LUMI. The overall project consists of seven collaborative projects between Finnish and Japanese, and Finnish and Colorado-based research organisations. They will draw on LUMI's resources in research relating to the climate, clean energy, physics, astronomy, and artificial intelligence.

Examples of collaborative projects:

- A joint project of the Finnish Meteorological Institute, the Cooperative Institute for Research in the Atmosphere (CIRA) and Colorado State University (CSU) deals with CO₂ sources and sinks.
- A collaborative project between Aalto University and Colorado School of Mines aims to speed up the discovery of materials for clean energy and zero-emission vehicles through high-performance computing.

- A collaborative glacier research project of the University of Lapland's Arctic Centre and several Japanese research institutes focuses on the behaviour of the Antarctic ice sheet and the global rise in sea levels.

Read more introductions to the projects:

[CSC announces the launch of two collaborative research projects with Japan](#)

[CSC announces the launch of five collaborative research projects with Colorado and Japan](#)

The standard of the HPC services is the highest I have experienced in any country. This is a very positive factor when recruiting international academic staff in data-intensive fields to Finnish universities.

– user feedback

User-centric approach in upgrade of data management and computing infrastructure

A procurement of next generation of the national data management and computing infrastructure was prepared in 2023. The plan is to replace the current Puhti and Mahti with a new supercomputer, Roihu, and to invest in and develop further the cloud services and Allas object storage service. User needs and expectations are constantly evolving, and the future data management and computing ecosystem must respond to them. A survey and interviews with users were conducted to explore their needs. The aim is to secure a comprehensive set of data management and computing services for Finnish researchers, in which LUMI complements the national system when tackling the most computationally challenging research problems. Scalability and interoperability will be addressed in the plans to ensure that the national data and computing intensive research infrastructures can use CSC's environment cost-effectively as part of their offer of services.

New user groups of the services have emerged, including scientists in new fields and student users. The services must also be approachable and easy to use for new users with no background in high-performance computing. Instructions, documentation and expert support for using the services will play an important role in their deployment.

Internationally competitive research infrastructure for data management and computing is a competitive factor for Finnish research. In a survey addressed by CSC to users of data management and computing services, 65% (N=506) of the respondents agreed that the services and infrastructure provided by CSC enable attracting international collaborators, and 72% (N=502) found that the services and infrastructure enable attracting research funding.

On average, in 2023, the willingness to recommend CSC's services was 8.7/10 (Survey addressed to data management and computing service users (N=572))

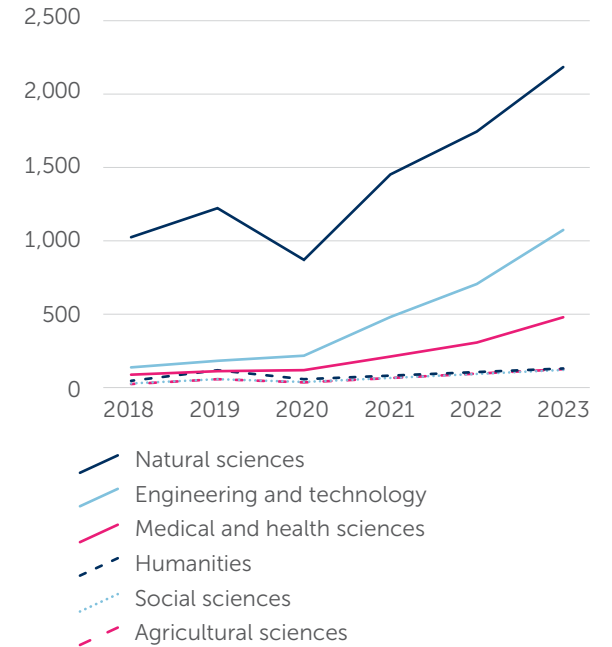
We received excellent support from CSC. Without your help, our AI research project would not have succeeded. We really appreciate it! We wish CSC every success!

– user feedback

Many of my partners have access to Puhti and use the services in collaboration with my research group. This is an excellent mode of working and has resulted in many publications of a high standard that would not have been possible in practice without visitors' access to the service.

– user feedback

Number of projects that used the data management and computing services by main field of science



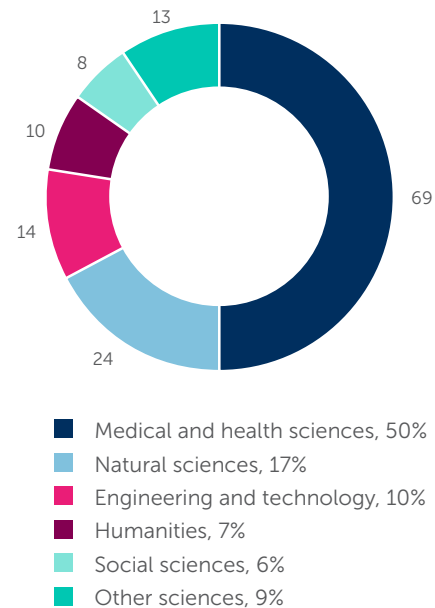
The figure shows the number of projects using billing units in 2018–2023 by main field of science. The field of science 'Other' and the fields of science missing from the projects are not shown in the figure (from 50 to 240 per year).

Use of sensitive data management services expanded

The offer and use of sensitive data services expanded in 2023. In this service family, SD Connect and SD Desktop services were improved based on user experiences and feedback. While the services are being developed as part of international cooperation coordinated by ELIXIR Finland (see the sidebar), they serve several fields of science in Finland.

New members of the service family were published in 2023. The Federated European Genome-phenome Archive (FEGA) service is part of European collaboration on secure storage of genome data collected from people for research purposes with their consent and for enabling secondary use of research data by permission. In the FEGA service delivered by CSC, higher education institutions and research institutes can grant permissions to use their data sets in the new SD Apply service. Researchers who have received permission can access the data in the SD Desktop service, through which use cases of high-performance computing can be run in CSC's Puhti supercomputer. Sensitive data management as part of high-performance computing was the key service update requirement expressed by researchers.

Distribution of fields in projects using SD Desktop
No. of projects



ELIXIR Finland enables cooperation on developing services and capabilities

CSC is responsible for Finland's participation in the European ELIXIR data infrastructure for biological information. ELIXIR is a global and European research infrastructure of 23 countries and more than 250 organisations. ELIXIR's goal is to collect and provide access to public life science resources. In 2023, ELIXIR and LUMI together with EMBL-EBI launched a [project](#) aimed at bringing the computation of known COVID19 viral sequences to a new level by using the massive processing capacity of LUMI.

Projects coordinated by ELIXIR Finland improve the capabilities of both CSC and the Finnish research community for processing and using sensitive biomedical research data sets. In 2023, ELIXIR Finland's project portfolio contained 28 projects carried out with competitive funding. One of these projects is Genomic

Data Infrastructure (GDI), which supports the ambitious goal of the [1+MG initiative](#) by enabling access to genomics and the corresponding phenotypic and clinical data in Europe.

CSC's involvement in ELIXIR enables Finnish researchers to access up-to-date information and computing services. By tapping these resources, researchers can advance such goals as developing [individual cancer treatments with AI](#), [understanding the gut microbiota](#), and [diagnosis of and new methods of treatment for autoimmune diseases](#).

[Read more user stories](#)

[Read more on the ELIXIR Finland collaboration](#)



Digital transformation is advancing

A digital service environment makes daily life easier for researchers, learners and teachers as well as education providers and public officials alike. When architecture descriptions and operating methods are created together, this collaboration speeds up the digital transformation. The use of data analytics and artificial intelligence is expanding, both in higher education institutions and central government, and creating new competence development needs.

Higher education institutions' Digivision 2030 project is advancing

CSC has supported the digital transformation of higher education institutions through its digital services and the Digivision 2030 programme. CSC provides the Digivision 2030 project office service for the higher education institutions, which determine the content of this service. In addition, CSC's experts work in a wide range of roles in the project. The first version (Minimum Viable Product) of the first Digivision service, [Opin.fi](#), was published for pilot use in 2023. The second and third versions are to be launched in 2024. A decision has been made to establish a limited liability company to operate the Opin.fi service. CSC has supported the interoperability and integration

of Opin.fi with other systems, including VIRTASTUDY information service. CSC also provides a service integrator service for the project.

Digitalisation makes daily life easier for learners, teachers and researchers

CSC's digital services make daily life easier in research and education, for example by giving learners, teachers or researchers quick access to information concerning themselves in different services.

In total, VIRTASTUDY information service contains the information of 1.5 million degree students at 37 Finnish higher education institutions and offers an easy way to use this information in a number of different services. Around 100 million VIRTASTUDY interface queries were made in 2023, which is almost twice as many as in 2022.

EMREX is a service that facilitates international student mobility by enabling information transfers between higher education institutions in different countries. CSC has supported EMREX deployment in higher education institutions, and the use of this service has increased significantly. In 2023, the Service for Cross-Institutional Studies (Ristiinopiskelupalvelu) was

introduced in several higher education institutions to support Finnish higher education institutions' educational cooperation and national student mobility.

CSC's JUSTUS is a Publication Information Reporting Service used by all universities of applied sciences and nine research institutes. In late 2023, it expanded to enable the collection and importation of researchers' information to the [Research.fi](#) service. Storage of information on research activities helps researchers and RDI experts accumulate merits by enabling them to showcase their competence, for example from the perspective of societal impact.

Research.fi creates national and international added value

Research.fi web service has attracted international attention as a progressive national research information system. It has served as an example for similar implementations in other countries (including in Denmark, Portugal, Austria). The service participates actively in projects funded under Horizon Europe. Among other things, the projects have developed European Open Science Cloud (EOSC) core services, improving the findability, availability, interoperability and reusability of research outputs, as well as responsible evaluation of research and more versatile consideration of open science in evaluations. The aim of participation in such projects is to create added value for service users at the national level and to take part in international discussions and development efforts with global impact.

In 2023, Research.fi introduced researcher profiles, in which researchers can themselves compile their information from several different source systems and, for example, send it to funding providers. The expert search function of Research.fi makes it easier

to find experts in different fields of science in Finland, serving the media, companies, decision-makers and others interested in science. Through the Research.fi interface deployed in 2023, information on research and research funding can be used in various services for researchers and in support of knowledge-based management, for example in higher education institutions and research institutes.

Monthly visits to Research.fi website



Education technology services support hybrid teaching

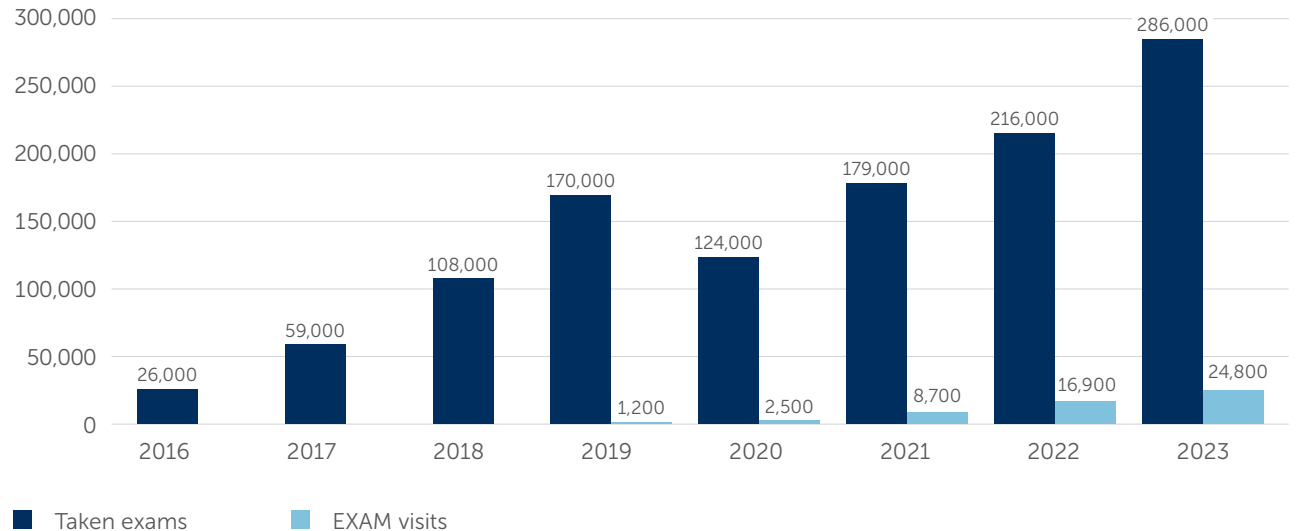
CSC’s education technology services enable effective and reliable modes of interaction in higher education institutions’ distance learning and hybrid teaching.

Funet Miitti service continued to be used actively in 2023. It offers a meeting solution for distance learning and hybrid teaching, and enables content sharing and integration into learning platforms.

The [Library of Open Educational Resources \(aoe.fi\)](#) built by CSC for the Ministry of Education and Culture contained 3,015 sets of learning resources in 2023, which was a year-on-year increase of 31%. The Library reaches an increasing number of learners and teachers in higher education institutions. Open sharing of learning resources facilitates the planning and delivery of teaching as well as teaching cooperation and enables continuous learning for learners. The medical education resource service provided by CSC, MEDigi, enables the sharing of resources between teachers in medical faculties.

CSC supports the planning and organisation of student admission processes in higher education institutions. In 2023, over 62,000 applicants participated in entrance examinations using solutions that CSC has

Exams taken using the EXAM service



provided to higher education institutions. EXAM, a digital system for demonstrating and assessing competence, gives students flexible opportunities to choose the time and place of taking their exams, not limited to their home institutions.

A key role in supporting cooperation between higher education institutions

CSC has not only solid expertise in digitalisation and technologies but also an in-depth understanding

of the needs of research and education. CSC plays a key role in bringing together experts representing different stakeholders, producing shared architecture descriptions, mapping needs and requirements, producing an overall picture of data flows, and supporting common practices and data specifications.

CSC promotes the digitalisation and national cooperation of higher education institutions by offering expert services to the Peppi consortium of

33 higher education institutions. The consortium develops the Peppi system, which supports studying and teaching at higher education institutions. The expert service promotes the harmonisation and interoperability of higher education institutions' systems, processes and practices.

CSC also has a coordinating and supportive role in several networks and working groups of higher education institutions and the Ministry of Education and Culture. In the area of research administration, CSC coordinates the Finn-ARMA network, whose 500 members represent higher education institutions and research institutes.

[Read more about CSC's support for cooperation](#)

Digitalisation supports education evaluation and anticipation

The Finnish Education Evaluation Centre (FINEEC) is becoming an important partner for CSC. Valssi, a quality evaluation system for early childhood education and care developed for FINEEC, was deployed and opened to all end users in August 2023. Valssi supports all organisers and service providers of early childhood education and care in their statutory evaluation task. The development of Joda, a system

for assessing learning outcomes in basic education, is also progressing rapidly and is set to be deployed in 2025.

CSC provides the Ministry of Education and Culture's Unit for Early Childhood Education and Care, Basic Education and Liberal Adult Education with expert services relating to an extensive frame of reference for digitalisation, which develops the steering and impact of digitalisation and the foresight capability of the administrative sector.

A new module on liberal adult education was published in the national statistics service Vipunen to provide information on the number of education programmes and teaching hours delivered as liberal adult education and the number of students participating in the programmes. The design of a separate module for foresight information in Vipunen was also launched in 2023. This module will expand the statistical service's data content from a completely new angle.

Competence in AI and data analytics in demand

In addition to offering AI models and tools for researchers, CSC makes extensive use of its AI and data analytics expertise to meet the needs of higher education institutions and the central government.

CSC analysed the results obtained in a national study that measured the physical functional capacity of pupils in basic education grades 5 and 8.

CSC carried out analytics experiments and provided expert support for analytics and artificial intelligence for the needs of the Digital services for continuous learning (JOD) programme. The objective of the JOD programme is to build a national digital service package for continuous learning to support smooth transitions between education and working life. For example, CSC's experts have analysed the match between demand and supply of labour using job advertisement data and created an experimental, algorithm-based interface and chatbot that offers personalised suggestions based on the user's individual background.

CSC completed a data analysis pilot based on the higher education institutions' application and admission data from 2019–2021. These data were used to build an interactive dashboard that visualises the entire data set, or annual data, helping to understand complex data sets, form hypotheses and identify rare subsets in the data.

As more advanced tools based on generative artificial intelligence become available, AI use will also

increase in expert work. To ensure that such tools are used responsibly, CSC has drawn up an AI policy for its personnel and examined shared needs in the development and use of AI technology together with its customers.

Promoting digitalisation in cultural heritage organisations and public administration

CSC has made use of and built up its capabilities for promoting digitalisation for the needs of cultural heritage organisations and the public administration. CSC supports many organisations in various information system and infrastructure projects. In CSC's collaboration with organisations, the participants' competence is built up through doing things together.

In 2023, CSC and the National Archives of Finland continued to develop the SAPA service platform that will enable the National Archives to archive central government documents and preserve them digitally. Work aiming to expand the SAPA service to the municipal sector began in 2023. This will help public actors, including municipalities and wellbeing services counties, to meet their archiving obligations laid down in the Information Management Act.

CSC has agreed with the National Library of Finland on cooperation that aims for building a shared e-library service for the municipalities. CSC supports the National Library in developing the e-library service and maintains a suitable and scalable server platform for these activities. This work was launched in late 2023, and the National Library and the municipalities plan to publish the service on UNESCO's World Book and Copyright Day (the national Day of Books and Roses) on 23 April 2024. Collaboration on this service is a new initiative based on long-term cooperation with the National Library of Finland.

The Academy of Finland is making large investments in its e-service system SARA, in which researchers can apply for funding and the Academy of Finland process applications digitally. In 2023, CSC and the Academy of Finland focused on building a new version of the system in accordance with the continuation plans, and funding for this purpose has been secured.



Benefits from synergy are born

The use of shared expertise, functions and technologies creates synergy benefits. Common architectures improve the quality and interoperability of services. Through international cooperation, we not only participate in collaborative development of services and practices but also boost capabilities at the national level. Together we can create a sustainable and competitive digital service environment.

Better service management through service integrator activities

Service integrator activities aimed at meeting the needs of higher education institutions have been built in interaction between CSC's service management office (SMO) and the Digivision 2030 project as well as the HEIs. The goal of these activities is to improve the quality of managing the IT services used by the higher education institutions by examining the field of services offered to the higher education institutions as a whole and simultaneously from the perspectives of both the customers and service suppliers.

The Digivision service management package and its processes were discussed with higher education

institutions in numerous SMO-facilitated workshops. The service management service offered to Digivision contributes to guiding the service integrator's development by creating precedents of managing shared services for higher education institutions. Apart from Digivision, the SMO conducted status reviews of service management from the higher education institutions' perspective on key services, including Virta study information service, the Research Information Hub and Funet services.

Data Room pilot enables shared use of register data

The Data Room pilot was set up in conjunction with VATT Institute for Economic Research in 2023. Its purpose is to make extensive cross-administrative use of different register data to produce more accurate and fast-paced analyses of the impact of societal and political decisions. For example, Data Room analyses have been used to target electricity subsidies during the energy crisis. The Data Room uses Statistics Finland's Fiona remote access environment provided by CSC.

FUNET turned 40

Funet, the Finnish higher education and research network, celebrated its 40th anniversary in December 2023. Recollections from the years gone by were published to celebrate the anniversary year ([link](#)).

Funet's service range was updated during the year as the planning of the 24/7 Cyber Security Operations Center (CSOC), which began in 2022, progressed to procurement stage and service launch in 2023. Service design was carried out in close cooperation with the higher education institutions, addressing their needs to respond to cyber threats.

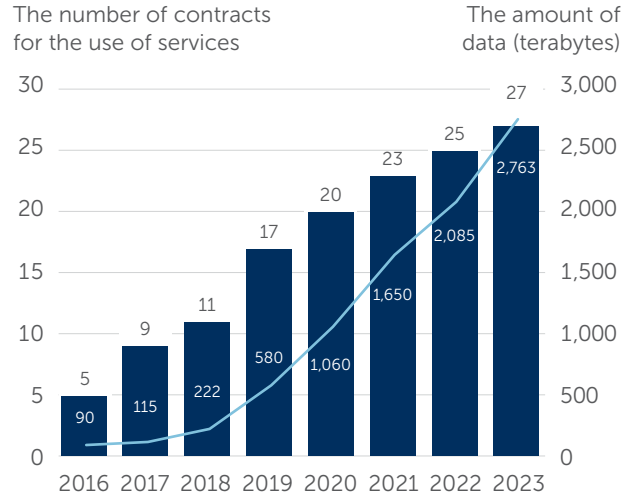
Digital preservation services for sensitive data

Digital preservation ensures the preservation and availability of digital data for the needs of researchers and other users over decades or even centuries. In 2023, the possibilities of using the Digital Preservation Service for Research Data (Fairdata DPS) were expanded as a feature for preserving sensitive data was created for it. Fairdata DPS users may authorise the retrieval of their data for further use. Permissions to process data sets in Fairdata DPS can now be granted in CSC's SD Desktop service for sensitive data. This is an excellent example of how the interoperability of services makes daily life easier for data owners and researchers.

A key role in developing architecture in the field

CSC has advanced the interoperability of the practices and services in the field by participating in architecture design. CSC plays a key role in work on the Reference architecture for research data management commissioned by the Ministry of Education and Culture. The reference architecture will facilitate service development, improve service quality, and propose policies and measures to improve interoperability.

Development of the use of Digital Preservation Services



Sustainable digital preservation

In 2023, a sustainability roadmap for 2026 was prepared for the Digital Preservation Service. Its annual carbon footprint was also calculated for the first time. The next goal is identifying its handprint, meaning how the organisations using the service can reduce their carbon footprints.

CSC participated in a working group that prepared a Reference architecture for open science and research on the initiative of the National Steering Group for Open Science and Research and the Ministry of Education and Culture. The reference architecture will enable controlled development of open science and research.

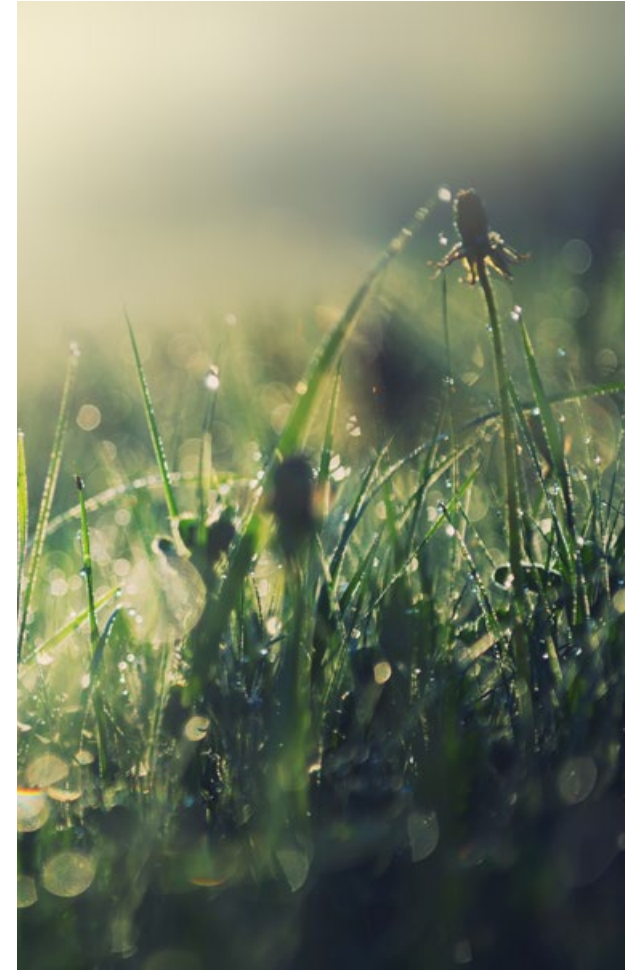
In 2023, the enterprise architecture for the Digital Preservation Service created by CSC was published, which updates and adds detail to the National Digital Library's enterprise architecture and the Reference architecture for open science and research in terms of digital preservation.

International cooperation helps improve competence and interoperability

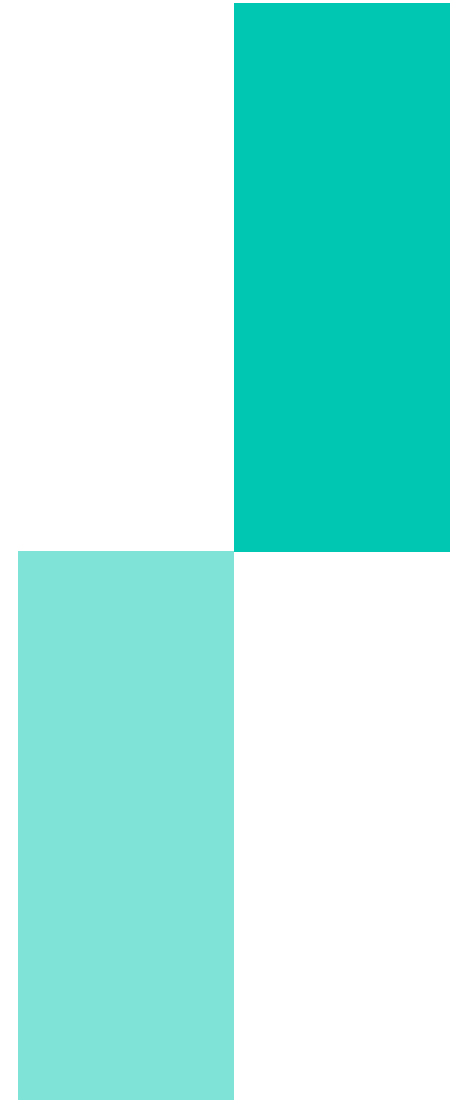
CSC's participation in several EOSC projects has strengthened its capabilities in the areas of interoperability, FAIR principles (data findability, accessibility, interoperability and reusability) and data management. The company has also expanded its expert networks and paved the way for Finnish researchers and services in Europe. The development and offer of CSC's services reflect the benefits of these projects. The CSC Research Data Management Competence Center makes these benefits more

widely available to CSC's customer organisations. CSC is also active in the Finnish EOSC Forum.

Since 2018, CSC has participated in the work of the ICT standardisation organisation Global Alliance for Genomics and Health (ga4gh.org) as part of the ELIXIR node activities. CSC took part in creating a standard for data management and access rights (GA4GH Passport), which was selected as a technical component for the European Genome Data Infrastructure (GDI). Launched in 2022, the GDI project published its key output, [the starter kit](#), in 2023. This was an important step towards data services that enable secure access to human genomics and the corresponding clinical data in Europe.



Appendices



Appendix 1 Correspondence with the Government Resolution on State Ownership Policy

The following table compares the scope of CSC's sustainability reporting to the model defined by the Government Resolution on State Ownership Policy (3 November 2011). The table indicates with links to the relevant information in this report or CSC's website:

SR = Sustainability report
 FS = Financial statements
 csc.fi = CSC's website

Reporting in accordance with the government resolution on state ownership policy	Included	Page in the report / link	Additional information / deficiencies / exceptions
Organization, Corporate Governance, and operating principles			
Basic information	Yes	csc.fi	
Social responsibility management and operating principles	Yes	SR p. 6	
Stakeholders and stakeholder dialogue	Partially	SR p. 9	
Financial responsibility			
Financial responsibility management			
Financial objectives and their attainment	Yes	SR p. 11 FS	
Financial key indicators			
Cash flow to stakeholders	Yes	SR p. 12	
Support for non-profit organizations and sponsorship	No		CSC neither supports non-profit organizations nor sponsors any groups.
Financial support received from the State	Yes	SR p. 12	

Reporting in accordance with the government resolution on state ownership policy	Included	Page in the report / link	Additional information / deficiencies / exceptions
Personnel			
HR management			
HR management	Yes	SR p. 17	
HR targets	Yes	SR p. 17	
Number and breakdown of personnel			
Number of personnel	Yes	SR p. 19	
Employment contracts	Yes	SR p. 19	
Turnover	Yes	SR p. 19	
Length of service	Yes	SR p. 19	
Age structure	Yes	SR p. 19	
Reorganizations and redundancies / Employer-personnel relations			
Redundancies and lay-offs	No		
Equality			
Gender breakdown	Yes	SR p. 19	
Equality plan	Yes	csc.fi	

Reporting in accordance with the government resolution on state ownership policy	Included	Page in the report / link	Additional information / deficiencies / exceptions
Remuneration			
Remuneration system and performance-based incentives	Yes	SR p. 17 csc.fi	
Competence development and training			
Development discussions	Yes	SR p. 17	
Training and competence development	Yes	SR p. 17	
Wellbeing at work			
Personnel satisfaction	Yes	SR p. 17	
Working capacity and wellbeing	Yes	SR p. 17	
Occupational health and safety			
Accidents	Yes	SR p. 17	
Sickness absences	Yes	SR p. 19	
Occupational health	Yes	SR p. 17	

Reporting in accordance with the government resolution on state ownership policy	Included	Page in the report / link	Additional information / deficiencies / exceptions
The Environment			
Environmental management			
Major environmental impacts of operations	Yes	SR p. 21	
Managing environmental issues	Yes	SR p. 21	
Environmental targets and their achievement	Yes	SR p. 21	
Environmental key indicators			
Energy	Yes	SR p. 22	
Air emissions	Partially	SR p. 22	
Water	Partially	SR p. 22	CSC is not a major consumer of water. Cannot be itemised. The property does not have lessor-specific water meters.
Waste	Partially	SR p. 22	
Compliance and environmental expenses	No		No major damage.
Products and services	No		Insufficient information at the moment; monitoring is being developed.
Transportation	No		Insufficient information at the moment; monitoring is being developed.
Materials	No		Insufficient information at the moment; monitoring is being developed.

Reporting in accordance with the government resolution on state ownership policy	Included	Page in the report / link	Additional information / deficiencies / exceptions
Social responsibility			
Local communities			
Impact on local communities	Partially	SR p. 9	
Bribery and corruption			
Measures and practices to combat bribery and corruption	Yes	csc.fi	
Political influence			
Political influence and support	Yes	csc.fi	CSC does not directly or indirectly support any political activities
Restriction on competition			
Compliance with competition law provisions	Yes	SR p. 15	
Compliance			
Compliance with legislation and regulations	Yes	csc.fi SR p. 15	CSC has not been involved in legal proceedings or received any fines or sanctions.

Reporting in accordance with the government resolution on state ownership policy	Included	Page in the report / link	Additional information / deficiencies / exceptions
Product responsibility			
Customer satisfaction			
Customer service and customer satisfaction	Yes	SR p. 9 SR p. 32	
Health and safety of products and services	Yes	SR p. 14	
Product and service information and marketing communications	Yes	SR p. 24	
Protection of documents and privacy	Yes	SR p. 14	
Sustainable consumption	Yes	SR p. 21	
Human rights			
Human rights issues relating to operations	Partially	SR p. 15	No clear human rights objectives have been set.
Supply chains			
Supply chain management			
Purchase principles and policies	Yes	SR p. 15	
Reporting principles and formulae			
Reporting principles	Yes	SR p. 48	
Formulae	Yes	SR p. 48	

Appendix 2 Reporting principles and formulae

The Sustainability Report covers all operations under CSC's control. Comparison data for the previous year is presented in accordance with the organizational model and operations of the year in question, and earlier key indicators have not been converted to reflect later changes.

As CSC does not have a direct or indirect holding of more than 50 per cent in any of the companies it owns, no information on companies in which CSC has holdings is included in our Sustainability Report.

CSC is aware of the challenges posed by gathering and collating data, and seeks to develop appropriate monitoring practices.

Measurement and calculation principles

Financial responsibility

The data used to calculate key indicators has been gathered from the accounting system and the audited Financial Statements. Key indicators have been calculated as follows:

Operating profit (%) = operating profit / net sales

Return on equity = net result / equity

Return on investment = (net result + taxes + financial items) / capital employed

Quick ratio = financial assets / (current liabilities - advances received)

Current ratio = (financial assets + inventories) / current liabilities

Equity ratio = equity / balance sheet total * 100

Gearing % = balance sheet liabilities / net sales (12 months)

Environmental responsibility

At our Espoo and Kajaani data centers, the energy consumed by infrastructure and IT systems (total energy) is separately monitored. Energy efficiency is measured as a PUE (Power Usage Effectiveness). PUE does not provide a complete picture of energy efficiency, as it should take the data center's usage rate into account. However, being the most widely used international benchmark, PUE was chosen as a key indicator because of its comparability:

PUE = (total energy) / (IT systems)

Another indicator, ERE (Energy Reuse Effectiveness), takes into account the utilization of waste heat (reuse):

ERE = (total energy - reuse) / (IT systems)

Social responsibility

Our data on HR responsibility is taken from a variety of source systems, such as the working hour monitoring system and personnel database. HR management personnel are appointed to compile the data and submit reports on the required key indicators and statistics. Key indicators have been calculated as follows:

Turnover = (number of employees leaving the company 1 Jan–31 Dec) / (number of employees 31 December) x 100%

Accident frequency = (number of accidents 1 Jan–31 Dec) / (1,000,000 work hours)

Sick leave rate (%) = (number of sick leave days 1 Jan–31 Dec) / (theoretical standard working hours 1 Jan–31 Dec) x 100%

Customer feedback

Inquiries about recommending services were made to users of data management and computing services on a scale of 0-10.



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