

**ICT Solutions for  
Brilliant Minds**

**CORPORATE SOCIAL RESPONSIBILITY REPORT**

**2018**

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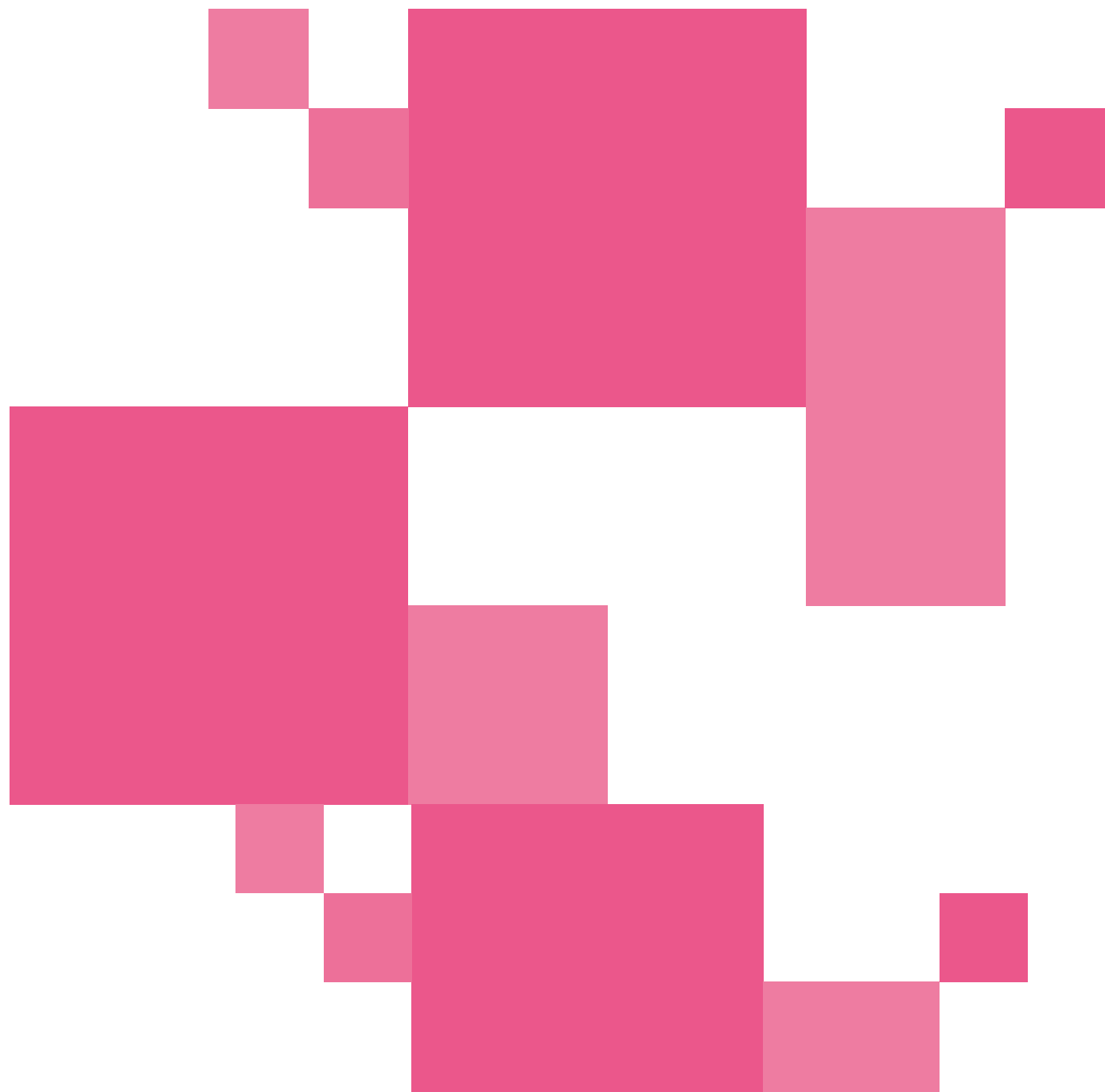
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# Managing Director's review

## Efficient services bring competitiveness

2018 was another year of excellent results for CSC. Our service range grew, and we gained more customers. At the end of the year, CSC had 350 employees, which represents a significant increase from the year before. The turnover also grew. Customer feedback on our services was mainly positive, and financially the year went according to plan, or even somewhat better than anticipated. Both national and international targets were mostly reached, and our new departures included EuroHPC, a European high-performance computing project.

During the year, data computing systems were put out to tender in the DL2021 project with excellent end results. First hardware supplied by the competition winner, ATOS, will be installed this spring. The Funet update continued according to plans. Different projects both in higher education and the areas of public administration and culture mainly made good headway. The DL2021 project will give research institutes access to CSC's computing and data management resources, which is excellent news for the cooperation and competitiveness of the Finnish research system.

The procured hardware will open up new possibilities not only in high-performance computing but also in data analytics and AI research. The project comes with significant investments in competence development, helping to maximise the efficiency of hardware use. In addition to internationally competitive capacity, research groups will have access to expert support in data management as well as methodology and software development.

CSC's activities expanded, not only in services for research – including computing, data and software – but also in other areas, such as digital teaching and learning services, higher education institutions' data collection, services for archives and libraries as well as electronic user authentication. Such customer groups as the public administration, education, and higher education institutions' information administration were more active than before, and service activities in these sectors will continue to grow. CSC was also

a prominent training provider in 2018, and training courses on different areas were both hosted at CSC and organised in customers' facilities.

CSC's international activities were significant last year, and the number of EU projects is set to increase further. The past year added to our responsibilities as project coordinators and work package leaders, and we have an increasingly important role in various projects, as we influence the direction of their activities with the aim of responding optimally to the needs of Finnish research. In addition to the EuroHPC project, the Elixir project in bioinformatics, PRACE cooperation on high-performance computing, and EUDAT and EOSC data management projects (European Open Science Cloud) were highly significant. In addition, a number of other larger and smaller EU projects were underway. CSC obtained a considerable amount of external funding subject to competition both through such EU-funded projects and national FIRI infrastructure projects in 2018. This funding will be used to develop high-quality services to support the competitiveness of Finnish research.

The cornerstone of CSC's operation is the company's values: together we can and care – responsibly. Rather than the success of the company alone, our goal is above all ensuring that Finland remains a leading country of research, education, culture and public administration ICT services internationally; in other words, the success of our customers. This way we can improve Finnish competitiveness and create preconditions for success. The most important role in reaching the targets is played by CSC's competent and continuously learning personnel.

*Kimmo Koski*



# CSC – Finnish expertise in ICT for research, education, culture and public administration

**CSC<sup>1</sup> IT Center for Science Ltd(CSC) is a Finnish centre of excellence providing world-class ICT expert services for research, education, culture, public administration and enterprises, thereby enabling them to succeed and generate benefits for society at large.**

CSC's primary customers are the Ministry of Education and Culture and organisations within its administrative branch, higher-education institutions and research institutes, and the public administration sector. We play a significant role as the Ministry of Education and Culture's instrument for steering and developing scientific policy. Our international activities boost the vitality of the Finnish research community and education system.

CSC's net sales totalled EUR 44,891,742.4 in 2018, and we employed 351 people at year-end. Our offices are located in Keilaniemi, Espoo and Renforsin Ranta business park in Kajaani.

## **Ownership and corporate governance**

CSC is a non-profit limited liability company with a special task owned by the Finnish Government (70%) and Finnish higher education institutions (30%). The company does not pay dividends or other gratuitous compensation. CSC is an in-house company of its owners referred to in Article 12 (1) and (3) of Directive 2014/24/EU of the European Parliament and of the Council on public procurement. CSC may provide services to other organisations than its owners, provided that it does not exceed the permitted limit for external sales as specified in procurement legislation.

At the beginning of 2017, the Ministry of Education and Culture as the representative of the government owner appointed an advisory body composed of the company's owners for CSC. The two-year term of this body expired at the end of 2018, and a new advisory body will be appointed in early 2019. The tasks of the advisory body are

discussing issues related to the company's steering, preparing the company's ownership strategy, and evaluating the company's overall societal and financial results.

The Annual General Meeting, Board of Directors and Managing Director share responsibility for CSC's administration and operations. The Annual General Meetings are held every year before the end of June. While the Board had six members in January – April 2018, the AGM appointed Veera Sylvius as the seventh Board member in April 2018. Mirjami Laitinen was Chair of the Board of Directors and Kimmo Koski served as CSC's Managing Director.

The primary norms governing CSC are the Finnish Limited Liability Companies Act (624/2006) and the State Shareholdings and Ownership Steering Act (1368/2007).

CSC's corporate governance is also subject to the Government Resolution on State Ownership Policy (13 May 2016), the Ministerial Committee for Economic Policy's statement on remuneration (13 August 2012), the company's Articles of Association, and the principles and instructions defined by the Board of Directors.



<sup>1</sup> CSC – IT Center for Science Ltd, Business ID: 0920632-0

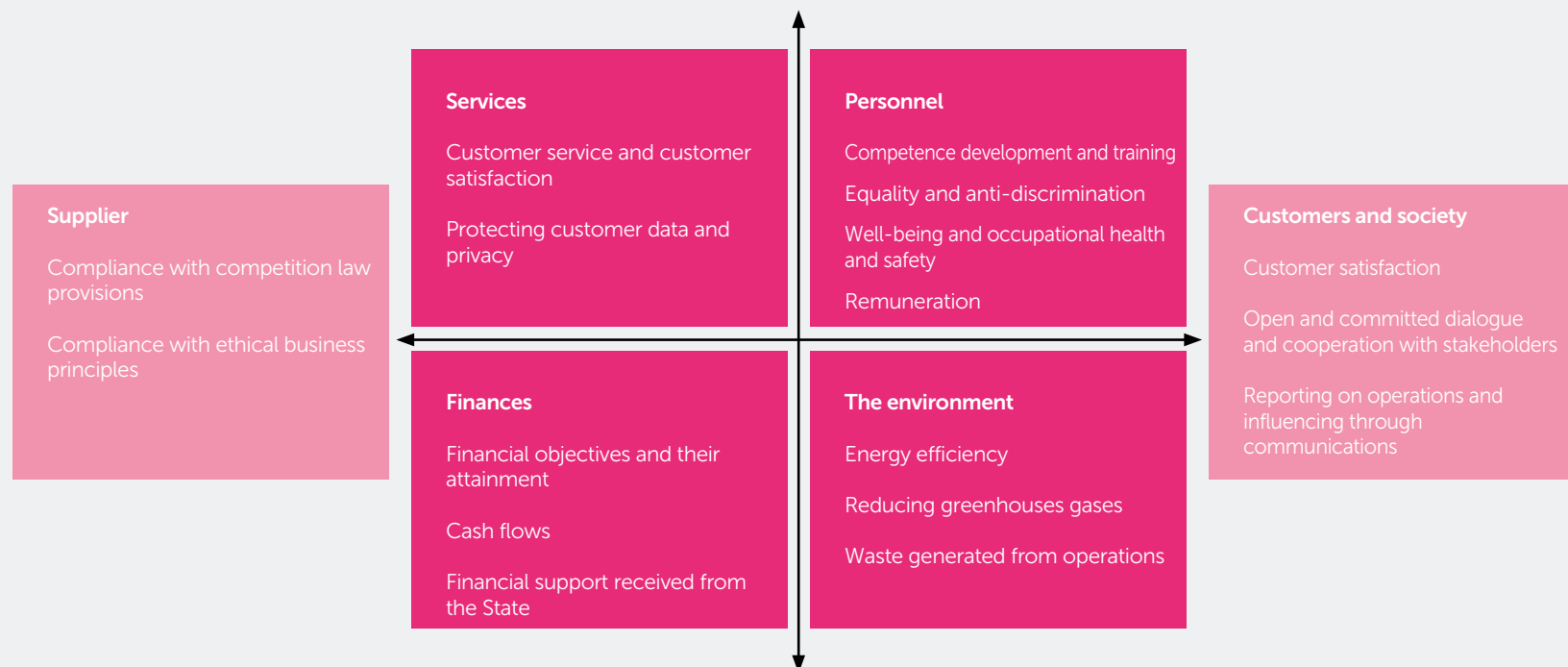
## Key social responsibility themes and material aspects

The focus of CSC's reporting is based on a materiality analysis of corporate social responsibility. The materiality analysis is used to identify the economic, social and environmental responsibility themes that are significant for both CSC's business and our stakeholders.

The analysis for 2018 drew on a stakeholder survey carried out in 2017, in which the views of both customers and owners on the company's capability to produce value and

its corporate social responsibility were analysed. The results of the survey remain valid for the company. The materiality analysis also drew on an analysis of sectoral trends produced by the Board of Directors and the management. Key themes brought up by the personnel, feedback from partners, and information on different stakeholders' expectations obtained as part of the company's normal activities were also used.

The results identified the following material aspects for reporting:



## Social responsibility management and operating principles

CSC's operation is guided by our values stressing cooperation, competence, caring and responsibility<sup>2</sup>. CSC's motto, "Together, Expertise, With Care, Responsibility", crystallises these values and is the foundation of our corporate culture. Our ethical guidelines (Our Way of Working – CSC Code of Conduct<sup>3</sup>) help us operate in line with our values. The Code of Conduct explains what good business practices and healthy engagement with stakeholders, society and the environment mean for CSC. Our Code of Conduct contains principles governing bribery, corruption and political lobbying. These guidelines apply to all CSC personnel and members of the Board of Directors. All topics addressed in the Code of Conduct are covered during personnel induction training. CSC's Code of Conduct is available on our website. CSC expects our service and goods suppliers to comply with the same principles.

CSC complies with the UN Convention against Corruption (UNCAC) and the OECD (Organisation for Economic Co-operation and Development) Anti-Bribery Convention. We will not accept any action that seeks to influence our own or our stakeholders' judgement. Neither do we provide any direct or indirect support for political party candidates, parties, or political groups.

CSC's Board of Directors monitors the management and implementation of social responsibility as part of its rules of procedure. At its annual Financial Statement meeting, the Board of Directors also reviews the social impact of CSC's services and their capacity to generate added value for society as per our special mandate. This assessment guides the Board's decision on the distribution of any bonuses to management and personnel.

The Board confirms the annually updated risk management plan and the approved residual risks. The Managing Director and Management Group are jointly responsible for ensuring that risk management has been appropriately arranged. Responsibility

management and the coordination of practical procedures are carried out through the company's routine management system.

CSC's Management Group is responsible for internal control, or the steering and operating processes used to ensure that we operate legally and profitably, and that reports on our financial position and activities are reliable. The CFO is responsible for internal auditing in cooperation with the auditor and other members of the company's management. CSC is committed to promoting sustainable development objectives that balance economic activities with ecological, social and cultural values.

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**Implementing different areas of environmental management is a routine aspect of everyone's daily work at CSC.**

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<sup>2</sup> <https://csc.fi/values>

<sup>3</sup> <https://www.csc.fi/code-of-conduct>

## Social responsibility management and operating principles

### Strategic ways of working

#### CSC boosts the success of customers:

- By creating added value together with customers and partners
- By means of transparent, agile and experimental action
- By developing interoperability and cooperation
- By being a forerunner and acting responsibly
- By exerting influence locally and globally

Education

#### Mission

CSC as part of the national research system develops, integrates and provides high-quality ICT services for research, education, culture, public administration and companies

#### Vision 2020

CSC is valued by customers and provides digital services of an international standard in its field

Research

Culture

Public administration

### Values

Community  
Assurance

Expertise  
Integrity

### Trends

Profusion of data  
Democratization  
Hyperconnectivity  
Climate change

Mobility  
Need for continuous learning  
Overconsumption

### Values

- Finnish expertise in ICT for research, education, culture and public administration

- We harness our expertise, networks and IT to boost our customers' success and benefit society at large

1

Enabling world-class data management and computing

2

Maximizing the value of data

### Objectives

3

Leveraging artificial intelligence

4

Smoothing the path to lifelong learning

# Stakeholders and stakeholder engagement

CSC engages in an active and continuous dialogue with its stakeholders. The aim is to strengthen our stakeholder relationships and understand the expectations and wishes placed on CSC, striving to provide a better response to them. The focus of our interaction is on CSC service users, customers and shareholders, personnel, partners, and research infrastructure financiers. Other key stakeholders include the authorities, local communities, and the media.

We cooperate and network with all actors in the sector openly, which provides opportunities for sharing views and development. CSC specialists are thus extensively involved in the programmes, projects, networks and networking events of the sector. Our stakeholders' expectations are regularly assessed through surveys (such as customer surveys and interviews, personnel surveys), at face-to-face meetings and quality conferences, and through participation in current debates in the sector. The networks of sectoral management and experts are key forums for this.

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**We cooperate and network with all actors in the sector openly, which provides opportunities for sharing views and development.**

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## Customers

CSC's customers include the Ministry of Education and Culture, higher education institutions, research institutes and infrastructures, cultural memory organisations, the Ministry of Education and Culture's branch of administration and public administration organisations. Within the limits of the Act on Public Contracts, the company may also sell its services to other parties to a minor extent.

### Customer orientation

CSC's service and development activities rely on strong customer interaction and doing things together. To ensure a customer-oriented approach, CSC follows a customer management model which defines how customer orientation is realised in the company's strategy process, different stages of the service life-cycle model as well as decision-making and prioritisation concerning new initiatives. The management model helps CSC intensify cooperation with customers and their networks by involving the customers in strategy work.

Customer orientation in CSC's strategy is ensured by means of participative work approaches, which produce invaluable data on customer needs and expectations. Network meetings, online brainstorming sessions and customer surveys are some of the methods used in dialogue-based strategy work with customers, in addition to customer meetings and other daily customer work. Customers' strategies and road maps are also key sources of information for CSC, as they explain how customers interpret the drivers of change in the operating environment and the opportunities associated with them, as well as customer goals (e.g. Road map for digitalization of higher education and research<sup>4</sup>).

CSC actively discusses development trends of the services and new forms of cooperation with its customers. Key discussion forums in everyday customer work are encounters, regular customer meetings associated with the services, and meetings

held to discuss more general themes in accordance with the annual calendar of our customer management model. These meetings generate new initiatives, which are honed together with our customers, while strengthening cooperation and the continuous steering of services.

Ideas and development needs related to higher education and research are collected in Ideabank, which was created together with ICT management at higher education institutions, and then channelled to the right actors for implementation. The Ideabank is also used for information activities targeting higher education institutions and other stakeholders. Ideas may be submitted, commented on and monitored by everyone, regardless of their position in the organization. Ideas are assessed by an idea committee, which meets approximately twice a month. The committee consists of representatives from ICT management at higher education institutions and CSC contact persons. In the next stage, this process will be expanded from higher education institutions to research institutes.

When a service reaches the production phase, the customer orientation methods change. Depending on the service, its attractiveness and use are monitored by such means as regular quality meetings, statistics and customer surveys, which are conducted to analyse the customer experience. Customer surveys and other feedback also provide guidance for further development of the service. Utilization data and customer surveys are used to determine when the service is nearing the end of its lifecycle.

A customer management function was created in 2018 to support customer work. It brings together the persons in charge of coordinating different customer segments and services as well as experts in marketing and communications, sales support and data management to find the most suitable solution for the customer together.

<sup>4</sup> <http://ka.csc.fi>

### Customer cooperation

CSC continued to step up its customer cooperation with a number of customer groups. Research institutes and higher education institutions with their networks were a focal area in these efforts.

CSC developed a cooperation model with higher education institutions with the aim of improving goal orientation and efficiency. To facilitate cooperation, two-way framework agreements between higher education institutions and CSC were developed, which enable both parties to assume the role of either the customer or the supplier. The higher education institutions' two-way framework agreement and the terms of personal data processing, service prices, terms of payment and security agreement are the same for all institutions with no exceptions. This simplified service procurement in both directions and in joint projects of different higher education institutions.

The Ministry of Education and Culture, along with research and innovation actors, is implementing a development programme for research infrastructures in data management and computing (DL2021) in 2017–2021. As part of this development programme, the services provided by CSC and funded by the ministry were also made available for research institutes in 2018. CSC liaised continuously with scientists at research institutes and organised joint workshops and training events. As a result, the number of active users in this sector doubled. CSC also concluded two-way framework agreements with research institutes.

### Diverse perspectives

CSC actively seeks the third-party views of different expert groups to develop its activities.

Key cooperation networks providing CSC with information and feedback include Universities Finland (UNIFI) and Rectors' Conference of Finnish Universities of Applied Sciences Arene. The TulaNet consortium is a channel for versatile cooperation with research institutes. CSC met research institute heads and developed the cooperation regularly under the auspices of TulaNet.

The Higher Education Information Management and ICT Steering Group appointed by the Ministry of Education and Culture maintains a situational picture of higher education institutions' ICT systems together with the institutions' networks and compiles a Road map for digitalization of higher education and research<sup>5</sup>. It operates as a steering group for higher education institutions' enterprise architecture work as well as engages in conversation and makes proposals on the content and policy choices of the services the Ministry of Education and Culture purchases from CSC for the institutions. The group also serves as a working committee authorised by the Funet community.

Other key cooperation networks include the HEI coordination group for student and teacher support services (KOOTuki) and the Research Support and Administration Network (TUHA). The Ministry of Education and Culture has also appointed management and steering groups to oversee the development of research administration data flows and research data warehouses, and a steering group for learners' data flows and VIRTIA Higher Education Achievement Register. These steering groups direct the development of services provided by CSC in their areas of responsibility.

<sup>5</sup> <http://ka.csc.fi>



The Ministry of Education and Culture has appointed a steering group for the development programme for data management and computing that will see to the extensive usability of the research infrastructure and services as well as the coordination, evaluation and prioritisation of the services. The task of the Computational Science Forum, on the other hand, is to evaluate future development in scientific computing from the perspective of Finnish higher education institutions and research.

CSC also receives regular feedback on its research services through the Scientific Customer Panel.

#### **Customer communications**

CSC makes active efforts to reach its stakeholders more extensively, and communications were developed in step with the customer-oriented offer. CSC's newsletters were updated in 2018, and as their principal themes were specified research, education and teaching solutions, digitalisation of public administration, product development and innovations as well as CSC's customer training.

In 2018, a total of 21 newsletters went out, of which 6 focused on research, 4 on education and teaching solutions, 2 on public administration digitalisation and 9 on CSC's customer training.

#### **Customer satisfaction**

In 2018, responses were obtained from one out of five recipients of CSC's customer survey. In general, CSC's customer service was considered to offer high quality, and the services are experienced as useful. The customer service was also praised for its friendliness and high level of expertise. Three out of four respondents said they would recommend CSC's services to a colleague. We met our customers at a number of different meetings, events, trade fairs, seminars, and training sessions. CSC participated

in key events of the sector in 2018, including the Physics Days, the UAS Days, the ISC High Performance conference, the Higher Education IT Days, the SC18 conference and EUNIS. CSC also arranged numerous visits to higher education institutions around Finland.

CSC collects feedback through customer satisfaction surveys, on social media and during customer encounters. In the future, an effort will increasingly be made to survey the customer experience in connection with digital encounters. In 2019, CSC will develop new metrics to improve its services and customer experience further.

CSC is developing a logical set of service channels relying on both its website and a variety of customer portals. The aim is to build a selection of service channels and offering based on customer expectations and a service path that is as user friendly and fast as possible. CSC also engages in direct dialogue with customers through our customer services and the social media. The customer service supports and assists customers in different phases of the customer relationship.

### Customer training

CSC wishes to offer its customers high-quality training on a wide range of areas. The company provides its customers with training in the efficient use of CSC's scientific computation, data analytics, data network as well as data management and data sharing services, in particular. The training courses, seminars and webinars rely on infrastructure offered by both CSC itself and its international partners. The customers also have opportunities to get acquainted with emerging methods and technologies. The demand for the training courses related to data analytics and AI utilisation has continued to increase steadily. The demand for online training is another rising trend in the wider field of training. CSC's efforts to respond to this trend have included developing further our webinars and online training on different themes.

In 2018, CSC organised 112 training days in its own facilities, at Finnish universities and universities of applied sciences, and at Nordic universities. The company has had new, modern training facilities at its disposal since September 2018. In total, 1,028 people took part in the training events. The level of participant satisfaction continued to be good. The general score awarded by those who responded to feedback surveys on the courses was 8.6 (on a scale of 1 to 10), and almost 76% of the participants (NPS index) would be happy to recommend CSC's training events.

Within the framework of the DL2021 development programme, the Ministry of Education and Culture invested approx. EUR 2 million in competence building both at CSC and among the expanding body of users<sup>6</sup>.

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**In the future, an effort will increasingly be made to survey the customer experience in connection with digital encounters.**

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<sup>6</sup> <https://minedu.fi/dl2021>

## Partners, suppliers and research infrastructure financiers

Long-standing relationships with suppliers, subcontractors and service providers play a key role in responsible business and continuous improvement of production. CSC complies with the statutes applicable to public procurement in its purchases and aims for fair treatment, long-term contracts and open cooperation. CSC's goal is to develop partnerships and thus guarantee good business conditions for all parties and the best possible service for customers. All suppliers are expected to comply with CSC's operating principles.

Partner activities are increasing in importance for CSC, and efforts were made to develop them during the past year. Regarding subcontractors, for example, stronger and more centralised partnership management was introduced to ensure that the partners' expertise is available for everyone at CSC and can thus benefit our customers. In the future, optimising competence between CSC's own and the subcontractors' resources will be vital. CSC organises centralised tendering processes, the results of which are also directly available for higher education institutions through two-directional framework agreements. In-house partnerships also play an important role, as an example of which can be cited our good cooperation with Government ICT Centre Valtori.

CSC is a partner in cooperation projects funded by the EU, the Academy of Finland, Tekes and NordForsk. CSC submitted grant applications to the Academy of Finland (FIRI) and the EU's Horizon 2020 framework programme. Success measured by the number and monetary value of projects as well as responsible cost monitoring and reporting on results in the agreed manner are key indicators of responsible business.

## Societal influence

CSC participates actively in social debate and influences the national and international operating preconditions that are significant for the company or its stakeholders. Boosting the competitiveness of Finnish research is a key objective in CSC's lobbying efforts<sup>7</sup>.

### Preparation of the 9th EU framework programme for research and innovation

CSC monitors actively the preparation of EU framework programmes and strives to influence them in line with its strategic objectives, for example through a national network of project actors. CSC has also participated in public consultations organised by the European Commission concerning the preparation of the next framework programme (Horizon Europe). CSC's responses to consultations can be read online on the site containing the company's statements<sup>8</sup>.

### International cooperation

Opportunities for international cooperation through EU projects and other networks are important for CSC. Being active on the international front builds up CSC's expertise and creates opportunities for service development, enabling us to offer new services for customers. In 2018, CSC participated in 22 EU projects, coordinating four of them. CSC was also responsible for leading ten work packages in total in different projects.

CSC initiated preparations for a tendering process concerning supercomputers as part of the EuroHPC project. EuroHPC Joint Undertaking for European high-performance computing is a European Union project, the first ambitious goal of which is to procure at least two pre-exascale supercomputers for Europe by 2020. One exaflop means processor computing power corresponding to  $10^{18}$  calculations per second. Finland is competing for having one of the pre-exascale supercomputers placed in CSC's data centre in Kajaani as a part of a European consortium.

CSC conducted negotiations on a broad-based European consortium that supports the placement of the pre-exascale supercomputer in Finland. The decisions on the locations of EuroHPC's first supercomputers will be made in summer 2019.

### Successes and progress in projects

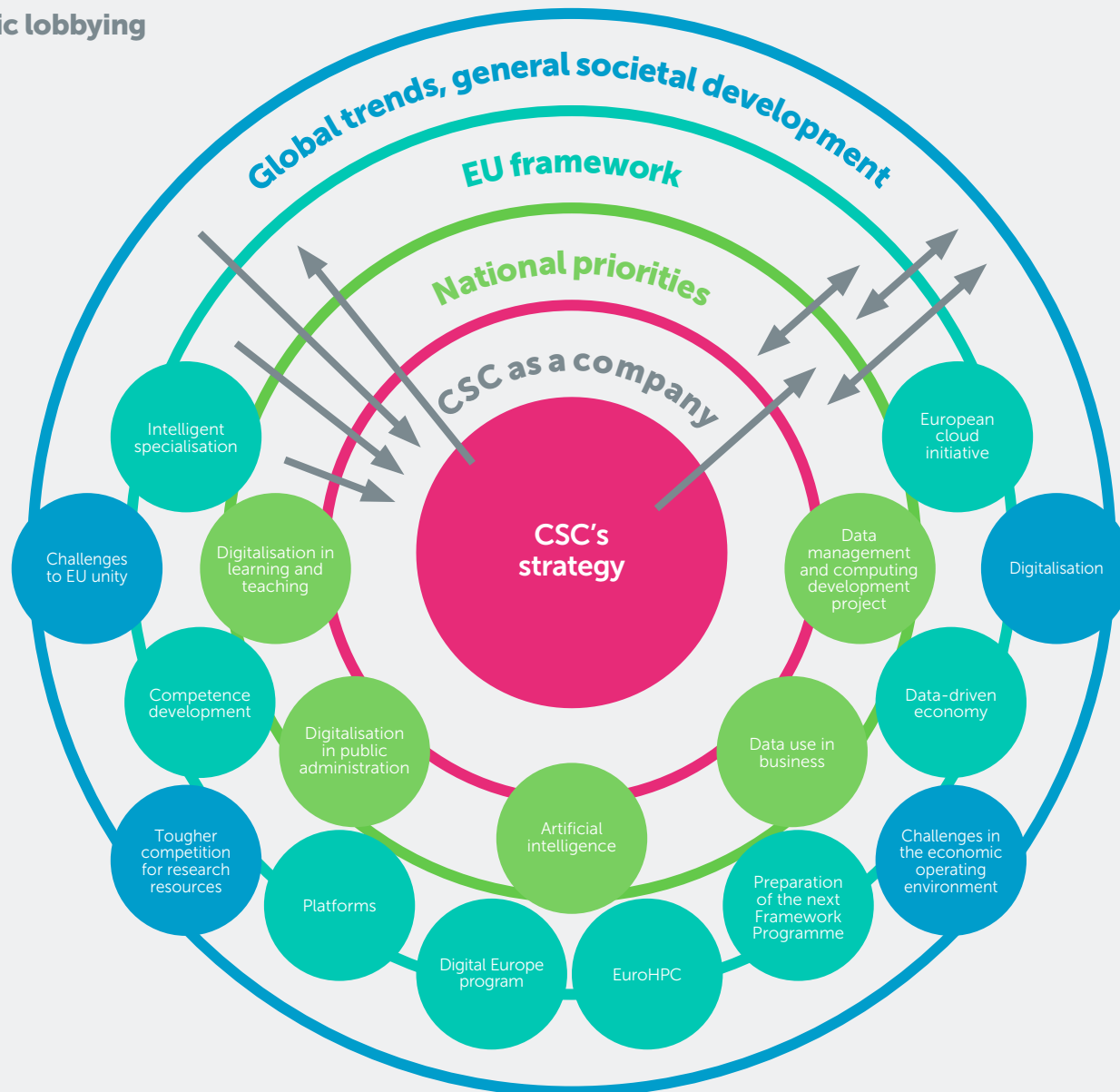
In 2018, a total of 53.5 million computing hours of high-performance computing resources on some of the most powerful Tier-0 computers in Europe were granted to research project leaders whose home organisation is in Finland through PRACE (the Partnership for Advanced Computing in Europe). These resources are worth EUR 1.6 million. Additionally, 41.6 million computing hours were granted through PRACE to projects in which a scientist based in Finland is involved in 2018. These resources are used for highly demanding computing projects in different fields of science.

In addition to these supercomputing resources, Finnish researchers' use of the most powerful high-performance computers in Europe amounted to almost 220 million computing hours in 2018. These resources, the monetary value of which is EUR 4,3 million, were granted to research projects led by Finnish scientists through PRACE in 2017.

The launch of the European Open Science Cloud (EOSC<sup>9</sup>) was hosted by the EU Presidency in Vienna in November 2018. The purpose of EOSC is to promote data mobility across the boundaries of countries and branches of science, thus improving the impact of science and research as part of the EU's Digital Single Market. In 2018, CSC participated both in EOSCPilot, a project which promoted the EOSC administration model, and the EOSCHub project promoting the EOSC portal. In the latter project, CSC's role was closely linked to developing the EOSC's longer-term strategy.

<sup>8</sup> <https://www.csc.fi/statements>    <sup>9</sup> [www.eosc-portal.eu](http://www.eosc-portal.eu)

## Framework for strategic lobbying



The Research Data Alliance (RDA) Europe 4.0 project had a busy year, during which the Finnish RDA node organised two national and one Nordic events and hosted a Nordic meeting for invited participants, the purpose of which was to promote the establishment of RDA nodes in other Nordic countries. RDA is a global project promoting research data mobility, in which researchers and data experts are working together to develop tools and recommendations for data sharing. The number of RDA members in Finland is 168, which shows that in proportion to its population, Finland is one of the most active countries in the Alliance.

ELIXIR<sup>10</sup> the European Life Science Infrastructure for Biological Information, is responsible for producing public research on long-term availability of data. Key services of ELIXIR include open global databases of genomes, proteins and pharmaceuticals which, for example, help researchers understand bacteria and viruses causing infectious diseases and develop new pharmaceuticals and treatments for them. Finland specialises in ELIXIR's data-driven computing services, especially secure findability and transfer over private networks of research data sets subject to data protection on humans.

CSC concluded a cooperation agreement aiming for technological development with the European Molecular Biology Laboratory (EMBL-EBI) in 2018. As an ELIXIR Finland Node and a Trygve partner<sup>11</sup>, CSC is developing secure research data services, including saving and storage services for human genome data, user authentication and authorisation services as well as a secure ePouta cloud computing environment. The ELIXIR project evaluated the impacts of the EU's GDPR regulation on the management of sensitive data in 2018.

Finding genome data approved for research purposes is a global challenge. CSC was involved in developing a standard and implementing a service based on it (Beacon), the purpose of which is to make the data sets easier to find. A centralised authentication and authorisation infrastructure (ELIXIR AAI) is needed for these services, and the development work is linked to the Global Alliance for Genomics and Health (GA4GH)

cooperation network. Additionally, Finland leads the work on data use and researcher authentication in this network together with colleagues from the US and participates in building a cloud platform based on GA4GH standards. In the national context, the ELIXIR project had a particular involvement in the planning of the Finnish Genome Center's functions and the architectural design related to it.

Compleap<sup>12</sup>, a two-year development project funded by the EU and coordinated by CSC, continued in the service area of training. The objective of this project is to support citizens' lifelong learning and competence development through digital solutions of a new type. Using the methods of enterprise architecture, the project is building a framework for a digital service ecosystem that supports learner-centric competence development. The existing offer of services will be complemented with the prototypes of new services where necessary.

During the first year, Compleap activities focused on developing the architectural frame of reference, designing a new type of personal competence profile crossing the boundaries of education levels, creating networks and identifying stakeholders.

Other partners in this network coordinated by CSC are the Finnish National Agency for Education, the University of Oulu, Jyväskylä Educational Consortium Gradia and DUO (Dienst Uitvoering Onderwijs), an agency subordinate to the Dutch Ministry of Education, Culture and Science.

<sup>10</sup> <http://www.elixir-finland.org/> <sup>11</sup> <https://neic.no/trygve/> <sup>12</sup> <https://www.compleap.eu/>



**EU projects in which CSC participated in 2018:**

Project	Duration	Coordination	Leadership of work package
AARC2	2017-2019		
BIOMIT	2017-2018		
CompLeap	2017-2019	x	x
CORBEL	2015-2019		
Data analytics accelerator	2018-2020	x	
E-CAM	2015-2020		
ELIXIR-EXELERATE	2015-2019		x
ENVRI-plus	2015-2019		
EOSC-hub	2018-2020		x
EOSCpilot	2017-2019		x
EUDAT2020	2015-2018	x	x
GEANT GN4	2015-2022		
High-Performance Digitisation	2018-2020	x	x
HPC-Europa3	2017-2021		x
HPC-GIG	2018-2020		
LIKUTPA	2017-2018		
NoMaD	2015-2018		x
MARINET2	2017-2020		
PRACE-5IP	2017-2019		x
RDA Europe3	2015-2018		x
RDA Europe4	2018-2020		
SeaDataCloud	2016-2020		

**For more information on CSC's international projects, visit our website at: [www.csc.fi/collaboration](http://www.csc.fi/collaboration)**

## Personnel

CSC's business and the services produced by the company are based on diverse and solid expertise; consequently, our personnel's competence, diversity and solution-centric approach play a key role in CSC's success.

At the end of 2018, CSC employed 351 persons, 91% of whom in an employment relationship valid until further notice. Personnel turnover was 7.8%, which is a good rate for the industry (for more key figures on personnel, please refer to the Board of Director's Report).

In 2016, the social partners signed a competitiveness pact under which the agreed working hours contained in collective agreements were extended by 24 hours a year. CSC implemented this extension of working time as intended. In 2018, the working hours were extended by increasing the length of the working day by six minutes. A new local agreement was negotiated in autumn 2018, which contains the arrangements for extended working time in 2019.

### Wellbeing at work and equal opportunities

Mental working ability plays a key role in employees' motivation and coping at work, particularly among those working in an expert role. At CSC, wellbeing at work was addressed in a variety of ways, such as by taking employee preferences into consideration, including them in discussions and decision-making, and charting their suggestions for developing wellbeing at work. In addition to this, CSC offers extensive occupational healthcare services and health insurance, as well as a wide range of subsidised opportunities for exercise, hobbies and recreational activities to its employees.

Wellbeing at work in CSC is measured by an annual personnel survey. Last year's survey was conducted on 18–31 January. The response rate in the survey was high at 93.1. The survey followed the structure used in 2017, and the questions focused on previously defined key themes.

### The key observations and findings of the survey were the following:

#### Strengths

1. The company's outlook is bright
2. The company rewards personnel fairly for good performances
3. Group supervisors trust their subordinates

#### Development areas

1. Effectiveness of decision-making
2. Cooperation between groups
3. Expectations placed on employees

### Based on the findings, actions were identified and launched in the following areas:

1. Development of internal communications, especially in the context of leadership
2. Improvement of mechanisms associated with leadership practices and decision-making
3. Development of practices related to cooperation and dynamics between the groups

CSC's Code of Conduct<sup>13</sup> describes comprehensively the principles related to personnel rights. They are complied with in all activities of the company. The Code of Conduct is complemented by an internal equality and non-discrimination plan, which is reviewed and updated regularly. CSC investigates the experience of non-discrimination in connection with the personnel wellbeing survey, in addition to which each supervisor is responsible for realising and addressing non-discrimination in the daily work.

### Competence development and remuneration

Performance and target discussions were carried out twice during the year to evaluate the achievements of the past period and to set targets for the next one. As an investment in competence, a unit specialising in personnel development was set up (HRD), the purpose of which is to produce and develop versatile solutions for taking control of and building up competence.

Incentive bonuses not exceeding 12% of the annual salary were granted to the personnel in 2018. The Board of Directors makes an annual decision on the amount of the performance-based incentive and the criteria for awarding it and authorizes the Managing Director to award the bonuses to the personnel.

CSC aspires to be an attractive and responsible employer that motivates its personnel to achieve outstanding performances. CSC also encourages the personnel's lifelong learning and supports further studies by means of sabbaticals for competence development. The majority of the personnel participated in various training packages aiming to develop their professional competence during the year, in addition to which their continuous on-the-job learning was encouraged.

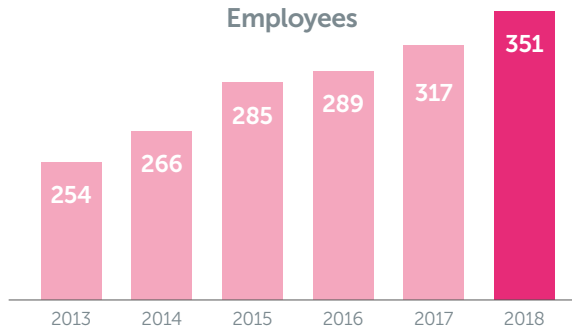
### Work environment development

In 2018, several refurbishment and development projects of the facilities were completed. The customer training facilities were revamped, and a new centre for customer negotiations was inaugurated. The old facilities for customer negotiations will be renovated for team work needs. The goal of the refurbishment was to create, in cooperation with the employees, an inspiring working environment that supports different work profiles. The refurbishments are expected to be completed by the end of 2020.



<sup>13</sup> <https://www.csc.fi/code-of-conduct>

### CSC personnel 2018



Personnel turnover 2013–2018, %

**3,2–7,8**

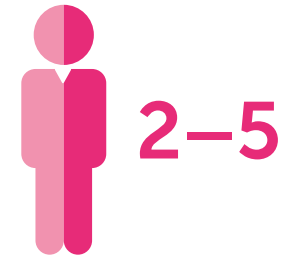
Sickness absences average days/person

**6,3**

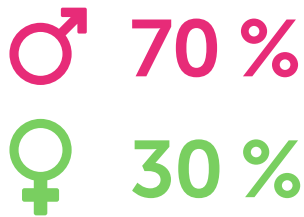
Average age

**42**

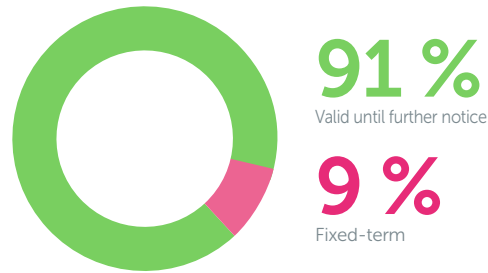
Training days 2013–2018 / person



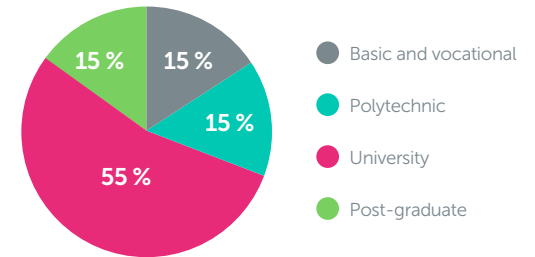
**Gender**



**Employment contracts**



**Educational background**



Average length of employment relationship, years

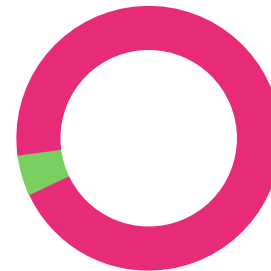
**8,0**

Average retirement age

**64**

**93 %**  
Full time

**7 %**  
Part time



In employment relationship for less than five years, %

**45**

# Service provision

**CSC harnesses the competence of its experts, networks and ICT to boost the customers' success. The company offers technology and service development solutions meeting customer needs in four areas of special expertise: research, education, culture and public administration.**

## **CSC is a reliable service provider and partner**

CSC's operation is based on good governance and transparency, compliance with data protection regulations as well as following the best security practices in service provision and internal functions. CSC has been granted the esteemed international ISO/IEC 27001 certificate for Information Security Management.

By this certificate based on reliable third-party verification, CSC can demonstrate its ability to manage, control and continually improve the information security of its services and operations. The certificate covers our data centres, ICT platforms, digital preservation (DP), and IaaS cloud services. In compliance with the terms of their information security agreements, certain CSC customers have also commissioned third-party security audits on the services provided for them by CSC.

CSC's management system covers such areas as general and HR management, communications, stakeholder relations, contractual matters, facilities, risks and deviations as well as resource and access management. CSC has several sets of internal guidelines that relate to data protection and transparency, in particular: our administrator's guidelines, data protection guidelines, and email policy. For more information about compliance, see CSC's website.

We monitor service availability and service-related guidelines, responsibilities and classifications on the basis of our internal production catalogue. CSC's Management Group discusses any significant deviations in information security. For more details on how CSC implements information security, visit <https://www.csc.fi/security>.

Responsibilities associated with services are agreed upon with the customer or supplier in the service contracts and the information security and data protection agreements associated with them. Service quality is monitored at regular quality conferences. Periodical customer satisfaction surveys are conducted to monitor not only service quality, expectations and customer experiences but also feedback on the security of the services.

CSC met the requirements of the EU's General Data Protection Regulation by appointing a Data Protection Officer, discussing issues related to data protection requirements in CSC's management groups, providing internal training on the subject and identifying CSC services and other activities in which personal data are processed. CSC also prepared a data protection policy, introduced conditions related to personal data processing in its contracts, and commissioned an external evaluation of risks associated with processing personal data. CSC representatives participated actively in the network of higher education institutions' data protection officers and gave presentations on the implementation of data protection at meetings of international stakeholders. CSC commissioned a third-party evaluation of compliance with data protection security requirements in its services for in-house use.

## **High-impact services**

CSC's services are of national significance and relevant to most Finnish people. CSC participates in international cooperation networks with the aim of boosting Finnish competitiveness. Through international collaboration, CSC proactively seeks innovations and new services for its customers.

CSC's service offering is built around openness and system interoperability. We seek to harness both the expertise we have acquired and the services we provide for our shareholders and the higher education sector within the framework of our special mandate more extensively to benefit public administration as a whole. In the contracts

we sign, we seek to retain user rights to the solutions we implement so that they can be reused, thus increasing cost effectiveness and promoting interoperability.

### Enabling scientific breakthroughs

A significant proportion of Finnish research groups use CSC's services to support their research. Almost two thirds of CSC's resources are allocated to researchers and scientific projects funded by the Academy of Finland.

The leading edge of Finnish scientific research uses CSC's computing and storage services extensively. Of the current 34 Academy Professors appointed by the Academy of Finland, approx. 40% were responsible leaders of projects granted by CSC in 2018. Approx. one half of the Academy of Finland's 26 leading research units conduct computational or data-driven research. 278 of the 925 persons (30%) in charge of CSC's research projects active at the end of 2018 had received Academy research funding in 2015–2018. The resource use of CSC customers who had received Academy of Finland research funding accounted for almost 60% of CSC's total resources in 2018.

Thanks to our annual agreement with the Ministry of Education and Culture, researchers at Finnish higher education institutions can use Finland's national computing and data management environment and the basic services associated with it free of charge. In 2018, the development programme for data management and computing, which the Ministry of Education and Culture is implementing together with research and innovation actors (DL2021)<sup>10</sup>, extended the free services to academic research conducted at research institutes.

Supported by development programme funding, a tendering process was organised in 2018 to upgrade CSC's entire computing and data management environment. The contract was awarded to the European company Atos, whose systems will be

commissioned stepwise in 2019. In 2018, four pilot projects were launched to ensure that the upgraded environment will also meet the needs of research institute's new use cases, including a service for transferring big data from measuring instruments directly to a data management environment.

In the central government's second supplementary budget, additional funding of EUR 4 million was allocated to the DL2021 programme to prepare for the needs of AI research. The DL2021 development programme will support the research and teaching activities of universities, universities of applied sciences and research institutes as well as national innovation activities, also securing the Finnish research community's competitiveness in data-driven and computing intensive fields of research.

As the programme for data management and development was launched, the Ministry of Education and Culture granted government research institutes the same rights to use the computing, storage and expert services provided by CSC free of charge as those already held by universities and universities of applied sciences. Research institutes welcomed this possibility, and the number of research institute users doubled in 2018 to 220.

A press conference on the upgraded computing environment was held on 12 December 2018. Its background materials, media contacts and press information packages and the launch of a website providing background information were jointly handled by Atos, CSC and communications agency Kaiku. The aim was to offer general-interest information on the project structured with a carefully selected viewpoint.

The project attracted extensive media interest. The potential news reach was over 5.5 million readers/viewers. This figure does not include MTV3 news broadcasts at 19:00 and 22:00 on 12 December 2018, which on average have over one million viewers in total.

### Allocations of computing resources in 2018

Conventional computing resource applications						
Resource allocation team meetings	No. of applications	Resources applied for (units)	Available/meeting (units)	Allocated resources (units)	Allocations on different rounds (%)	Successful applications (%)
<b>Total</b> (16 allocation meetings)	748	1 192 680	744 000	947 808	88,6	79
Grand Challenge applications						
1/2018 (deadline 30 April 2018)						
<b>Total</b>	11	218 400		80 000	7,5	37
<b>Applications for international use</b>	53	45 186		42 190	3,9	
<b>Total of applications</b>	812	1 456 266	744 000	1 069 998	100,0	73

Research services available through CSC are suited for all branches of science. Support is offered in all phases of a research process. CSC's resource allocation team grants customers computing and storage resources on application. Rather than actually evaluating the scientific quality of an application, CSC carries out a technical evaluation to ensure the effectiveness of the methods employed in the research. CSC also oversees

responsible use of resources for the needs of either research or teaching. The resource allocation team follows national science policy and adheres to the priorities set by Finland's science administration. Computing resources are primarily allocated to national research. Reports on allocated resources are made once a year to CSC's Board of Directors and twice a year to the Ministry of Education and Culture.

Applications for so-called Grand Challenge research projects, which require significant computing or storage resources, and for international high-performance computing resources are assessed by the Scientific Customer Panel, which consists of Finnish research team leaders from a variety of scientific fields.

Regarding future technologies, access to D-Wave2000Q quantum computer located in Canada was organised for Finnish researchers. The usability of this rapidly advancing technology is monitored in cooperation with research groups of the field.

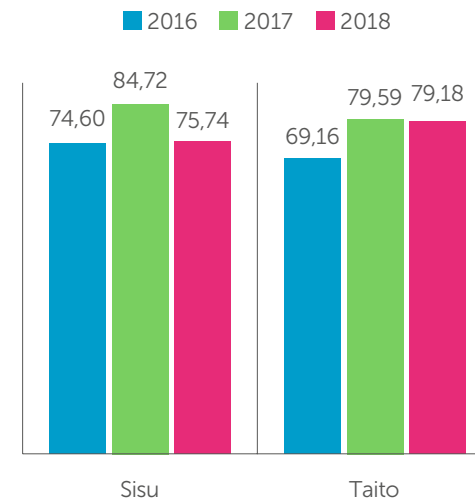
Finland's national computing and data management environment is being developed through long-term collaboration between the Ministry of Education and Culture and the research community. The acquired resources are scaled to meet the needs of Finnish science. If researchers are using software that will require an extremely high volume of computing resources, we perform scalability tests to ensure the efficient use of resources.

The computing and data management environment had a good level of accessibility in 2018.

The usage rate of supercomputer Sisu dropped to 75% (in 2017: 85%) whereas the usage rate of Taito remained at 79% (in 2017: 80%). While an effort is made to maintain a high resource usage rate, increased usage also leads to longer waiting times, which reduces the appeal of the computing environment for small and medium users. The record-breaking allocations of PRACE resources to Finnish researchers in 2018 contributed to reducing the pressure on Sisu resources. The resources allocated through PRACE on the two previous rounds correspond to 3.5 months of Sisu use at a 100% usage rate.

The volume of memory use by virtual computers, which describes the growth in their use, increased in \* cPouta service by 50% and in \*\* ePouta service by 154% during the year. The greatest volumes of big data processed in CSC's computing and data management environments continue to originate in life sciences research.

**Utilization levels of computing and application servers in 2016–2018 (compared to maximum capacity)**



The volume of memory used by virtual computers, which describes the growth in use, increased in \* cPouta service by 71% and in \*\* ePouta service by 45% from January till December.



### Supporter of continuous learning

Each student at Finnish higher education institutions uses services implemented by CSC. The joint use of these services is also expanding to vocational education and training and general education. Services implemented and maintained by CSC guide and develop the entire Finnish education system and build preconditions for lifewide learning.

The student information of 38 Finnish higher education institutions is stored in VIRT A Higher Education Achievement Register. All in all, the service brings together the data on approx. 2.7 million students, almost 2.5 million study rights for degree education, and 2.2 million study rights for non-degree education. The service contains information on approx. 1.3 million degrees and over 73 million other study attainments. This information is used in services offered by higher education institutions and companies, student admissions and different activities of the authorities, including the services of the Finnish National Agency for Education and the Social Insurance Institution. In 2018, almost 3 million searches were run on the VIRT A interface, including over one hundred searches in a single day.

VIRT A publication service collates information about research publications from all Finnish research organisations: the details of approximately 62,000 publications are transferred to the service every year (354,269 publications in total). Publication data was used for the first on the Academy of Finland's application round of September 2018, at which time 345,000 publication queries were made in VIRT A using the Academy's online service. Other data sets in the research data warehouse developed by CSC include data describing research infrastructures, researchers and projects.

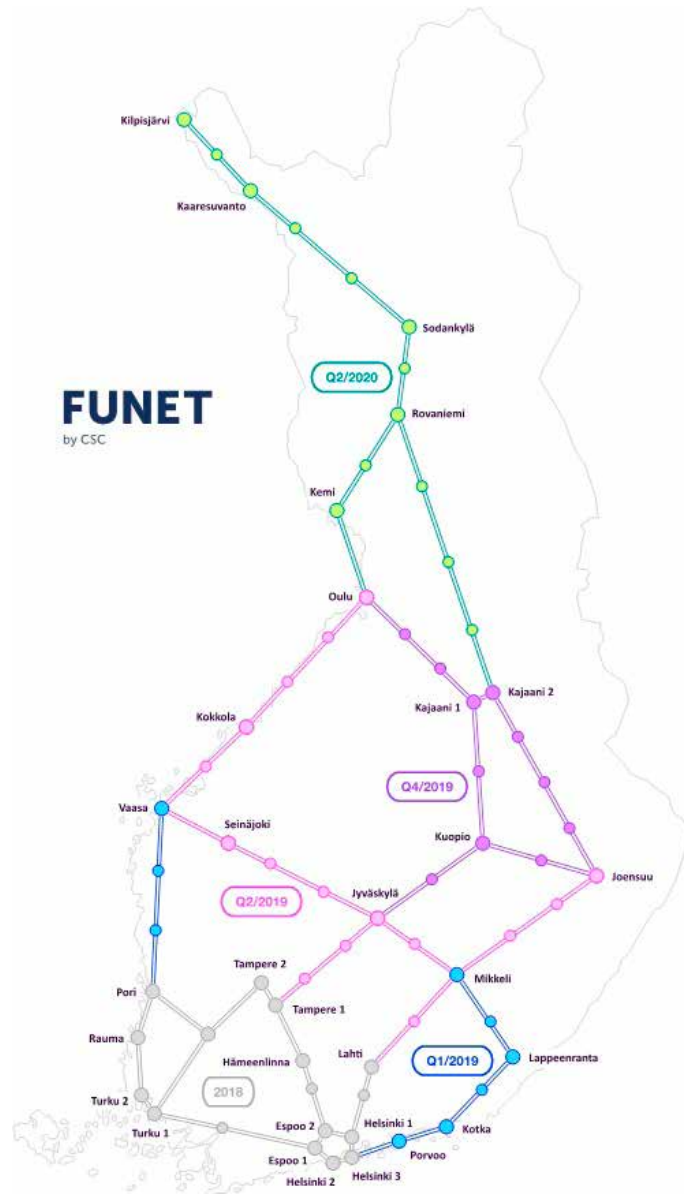
In Arvo, the Finnish National Agency for Education's Education Management Information Service provided by CSC, approx. 11,000 students who completed a Bachelor's degree at a university, as well as 23,300 students who completed a Bachelor's degree and

2,900 who completed a Master's degree at a university of applied sciences, responded to feedback surveys addressed to graduating higher education students in 2018. The respondent numbers in different surveys conducted using this service increased by 7%–23% year-on-year.

The users of Vipunen, a statistics service maintained by CSC for the educational administration, increased by 36% year-on-year to a total of 65,228 users. This service contains information on Finnish education and research organisations (approx. 3,500 organisations). The topics covered include student and degree numbers, student admissions, study progress, graduate placement, personnel, finances, internationality, and publications. The information is used in decision-making on education and science policy and to support education and research organisations' decision-making. In late 2018, approx. 2,000 different reports on the statistics and indicator data contained in Vipunen were available in three languages (Finnish, Swedish and English). Some of Vipunen contents can now also be accessed by other services through a machine-readable interface.

In the EXAM service package also offered by CSC, 27 Finnish higher education institutions are developing joint methods for electronic competence demonstrations. The DigiCampus development project promotes the shared use of this service, for example by developing higher education institutions' joint examinations as well as tools relying on artificial intelligence for automated assessment of essay-form examinations.

CSC coordinates a joint project of the Ministry of Education and Culture and the Finnish National Agency for Education aiming to promote open learning materials. This project was launched in autumn 2018 with the goal of offering a national learning material service for all levels of education.



### An information system and network specialist

Funet, a fast and reliable data network for Finnish higher education institutions, research and education, covers all Finnish institutions of higher education irrespective of their administrative sector and serves over 370,000 end users across Finland. The story of Funet started with the Funet project launched in early 1984. 1 December 2018 also marked the 30th anniversary of the day on which Funet connected Finland to the internet.

In 2018, installation work related to a life cycle upgrade of the network began in the Funet 2020 project. The installation and commissioning of the new network went ahead in Helsinki region and elsewhere in Southern Finland. The upgrade will continue stepwise in 2019–2021. The commissioning of the new network progressed successfully and on schedule. CSC also participated in planning a life cycle upgrade of the joint Nordic NORDUnet network. In this work, special focus was on the needs of organisations using Funet.

The Funet Tiimi web conference system enables collaboration across organisational boundaries irrespective of time and place. In total, almost 500,000 hours of conferences, seminars, and online training were organised in the online conference environment in 2018. Some 47,000 higher education users have registered for the service using the Haka identification system. The service is used by almost all higher education institutions.

Funet Etuubi is a video publication system operating in a hybrid cloud. Finnish higher education institutions had posted around 12,000 videos on Etuubi in 2018, which were viewed almost 100,000 times. Etuubi is mainly used for education but also for marketing and event streaming and as a distribution platform for presentation material. Etuubi can be used not only to publish existing videos but also to produce videos and enrich them with learning materials in the form of questionnaires. The platform makes students' work

easier by offering an alternative for conventional teaching methods and making learning independent of time and place.

In 2018, CSC also commissioned the new-generation Zoom videoconferencing system in more extensive production use. There was wide-spread interest in the system in different organisations, and it has been deployed by 13 organisations.

The use of mobile terminal devices went up in 2018, and all our video services can now be accessed on mobile platforms.

### **CSC promoted MPASSid service deployment and brand recognition**

MPASSid is a national single sign-on solution promoting lifewide learning for secondary level institutions and basic education schools. The service links producers of digital teaching materials, student registers and different login methods together. MPASSid allows an education provider access the services of many different providers using the same IDs.

The Ministry of Education and Culture commissioned CSC to implement a marketing and communication service package for MPASSid. This assignment included the planning and direction of project communications, service design, content marketing, event production, customer path design and analytics. Together with its partners, CSC also planned and implemented a launch campaign targeted at municipal decision-makers and service providers.

Customer feedback received by CSC noted that the communication and marketing package implemented by CSC had promoted the recognisability and visibility of the MPASSid service and facilitated the fast deployment of the service by the intended users. In early 2018, the goal was set at ensuring the participation of 30% of Finnish

municipalities in the MPASSid trust network. By the end of November, the number of participating municipalities exceeded 150, which is approx. 50% of all municipalities in Finland. 170 education providers had signed the agreement, and the service already had more than 200,000 end users.

### **Data analytics and artificial intelligence**

The new, so-called single cell measurement technology has revolutionised life sciences and medical research. CSC made the use of single cell data possible for a large number of researchers by offering them the latest analysis tools in a user-friendly format. The company had a special focus on scalable bioinformatics training and produced a Chipster<sup>14</sup> learning package which enables independent study and includes lecture videos and sample analysis sessions. Chipster's new web-based user interface makes it easier to use than ever, and it can also be downloaded dynamically based on the selected branch of science (bioinformatics/linguistics).

The Notebooks service<sup>15</sup> now provides a possibility of creating your own course environments. Teachers of university courses can use the service to offer their students a consistent data analytics and programming environment and to hand out exercises and materials in connection with the course. This feature has rapidly gained popularity, and it has already been used by approx. 500 students.

CSC set up a team focusing on artificial intelligence and data analytics in 2018. The team produced a so-called AI maturity model used to consult CSC's customers in the use of AI methods, especially in the area of public administration. The team also developed the utilisation of data on CSC service use in decision-making and on the customer interface by creating a new analytics portal. Regarding AI environments, the team engaged in the benchmarking of different types of hardware. Underpinned by this work, CSC procured artificial intelligence computing hardware based on high-performance GPU acceleration as part of the DL2021 project.

<sup>14</sup> <https://chipster.csc.fi/> <sup>15</sup> <https://www.csc.fi/web/education/notebooks>

### Fairdata-palvelut

The national research data services produced in the Open science and research project were updated, creating the Fairdata service package together with the National Library of Finland in 2018. CSC also developed other support services, including those related to permanent identifiers and data management support. CSC launched the development of a shared authentication and authorisation service to facilitate the use of restricted metadata and data sets in a number of current and future national services.

### Data management

CSC upgraded its data management support services. The requirements of national research organisations and international cooperation were taken into account in the service development, especially regarding data management planning, compatibility of data services and training requirements.

In 2018, reports were produced on such themes as the repeatability and verifiability of national research, FAIR service level in the Nordic countries, a societal impact assessment of ELIXIR, and the impacts of the EU's General Data Protection Regulation on the management of sensitive data, in addition to which national guidelines for the DMPTuuli tool<sup>16</sup> concerning the management of sensitive data were drawn up.

In the area of strategic influence at the national level, we participated in the planning of the Genome Center led by the Ministry of Social Affairs and Health/National Institute for Health and Welfare, in particular, and architectural design related to the Center. CSC also influenced the creation of a federated computing environment and standards for data findability and management of authorised access, as well as the design and implementation of a common European operating environment, through ELIXIR and the Global Alliance for Genomics and Healthcare (GA4GH).

### Sensitive data and ePouta cloud service

The hardware of the ePouta service<sup>17</sup>, which is intended for the secure processing of sensitive data, was upgraded in keeping with customers' preferences and needs. The computing and storage capacity increased considerably, enabling especially the processing of significant genome data sets. Additional memory and GPU computing capacity were also procured for the ePouta service, for example for the needs of bioimaging.

The most important development areas were the controlled reception of sensitive data sets, a remote desktop for the ePouta service, and the automation of data management for large sets of measurement instruments.

With about 326,000 end users, HAKA is the most widely used authentication system in Finnish higher education institutions and research institutes. About 32 million service logins are made through Haka every year, at best over 4.4 million a month.

### Supporting culture and the public administration

CSC designs, provides and maintains information system solutions tailored for its customers. Cultural and public administration actors are some of the most important customer groups. For example, CSC is involved in implementing and maintaining the Radio and Television Archive of the National Audiovisual Institute, the National Archives services, and the National Library's Finna service. CSC contributes to the digitalisation of public administration services as a partner to such stakeholders as the Population Register Centre in the implementation of the suomi.fi services, and maintains and develops further a remote desk environment for Statistics Finland's national register-based research.

<sup>16</sup> <https://www.dmptuuli.fi/> <sup>17</sup> <https://research.csc.fi/epouta>

Partnership with the State Treasury brought CSC new public administration customers. The development of the Financial information service for municipalities and counties for the State Treasury progressed on schedule. The State Treasury also entrusted CSC with the production period maintenance and development of the information system. The Financial information system for municipalities and counties will be commissioned in 2019. In late 2018, the design of a public administration analysis and reporting service, including its information platform development, was also assigned to CSC. All this requires relentless competence development related to the technologies selected by the customer (MS Azure, PowerBI).

CSC continued its central role in a project aiming to develop joint information management in cooperation with the Population Register Centre. This project was concluded at the end of 2018, and the services can be used at [yhteentoimiva.suomi.fi](http://yhteentoimiva.suomi.fi).

Under the leadership of the Ministry of Education and Culture, CSC participated in design work in a digitalisation project for central government grants (DIVA). CSC consults the project in the design, specification and description of the operating concept and the information systems supporting it.

### Digital preservation

By using the digital preservation service implemented by CSC and funded by the Ministry of Culture and Education, cultural memory organizations can fulfil their statutory obligations to preserve national digital cultural heritage. Agencies having joined the service now include the National Audiovisual Institute, the National Archives, the National Library, the Institute for the Languages of Finland KOTUS, the Music Archive Finland, the National Center for Accessible Literature and Publishing in Finland Celia, the National Board of Antiquities, the Society of Swedish Literature in Finland, and the Finnish Social Science Data Archive.

Rather than only being a means of preserving the bits of which digital data is composed, digital preservation also secures the usability and intelligibility of such data – for decades or even centuries. In production year 2018, the volume of materials stored in the digital preservation service exceeded 240 terabytes.

CSC provides a Digital Preservation Service for Cultural Heritage, which enables the preservation of digital materials, for the Ministry of Education and Culture. The Digital Preservation Service for Cultural Heritage<sup>18</sup> takes care of the integrity, authenticity and logical functioning of the data. By using this service, national cultural memory organizations fulfil their statutory obligations to preserve national digital cultural heritage – for up to decades and even hundreds of years.

By decision of the Ministry of Education and Culture, the National Center for Accessible Literature and Publishing in Finland Celia and the Music Archive Finland joined the ranks of the Digital Preservation Service for Cultural Heritage users as new organisations. The National Audiovisual Institute, the National Archives, the National Library, the Institute for the Languages of Finland KOTUS, the National Board of Antiquities, the Society of Swedish Literature in Finland and the Finnish Social Science Data Archive had already joined the service earlier. In late 2018, the Digital Preservation Service for Cultural Heritage was responsible for storing over 240 terabytes of participating organisations' data.

In addition, CSC maintained the national specifications of digital preservation and digital preservation software published as open source code to support organisations and to reduce their workload required to produce data packages compliant with digital preservation specifications in 2018. Additionally, cooperation with the National Library of Finland was initiated with the aim of producing a service package that promotes the digitalisation of central government documents.

<sup>18</sup> <http://digitalpreservation.fi/>

# Procurement

CSC adheres to both its own procurement guidelines and the Act (1397/2016) and Decree (1397/2016) on Public Contracts. Procurements are also governed by legal practice relating to the Act on Public Contracts. Additionally, we comply with other acts relating to each procurement and other legislative requirements applicable to the object of the procurement, such as the Act on the Openness of Government Activities and, on a case-by-case basis, also the General Data Protection Regulation and the Act on the Contractor's Obligations and Liability When Work is Tendered Out.

Even minor procurements that do not fall within the scope of the Act on Public Contracts are put out to tender in accordance with CSC's procurement guidelines. In strategically significant procurements, suppliers' subcontractors must also be approved in advance.

CSC has entered into several framework agreements with goods and service providers subjected to a tendering process by Hansel Oy. Unless there is a particular reason not to, CSC always uses Hansel's framework agreements, which also take environmental perspectives into account. CSC's procurement guidelines instruct purchasers to consider environmental factors in accordance with the life-cycle model: during the planning phase, during use, and at the end of the cycle.

CSC includes all information security requirements in its calls for tenders. Procurement contracts, and in particular those for IT services, software and equipment, contain a separate appendix on security. If necessary, the head of information security or their named representative will be involved in the planning and implementation phases of a procurement. 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.

In spring 2018, CSC concluded the procurement processes related to Funet 2020 network upgrade initiated in 2017, as the last procurement contracts associated with the tendering process were successfully signed with hardware and optical fibre suppliers in January–March 2018. As the contracts were concluded, the actual implementation of the new network could begin.



# The environment

**CSC is a pioneer in the sustainable development of ICT services and committed to promoting sustainable development objectives in all operations. Environmental management is integrated in the normal work of CSC's Management Group. We seek to minimise the environmental loading caused by our activities.**

Business flights and the electricity consumed by data centres account for the largest share of CSC's environmental loading. Data centres accounted for approx. 98 per cent of CSC's electrical energy consumption in 2018.

## **The following environmental principles govern CSC's environmental responsibility:**

- CSC aims for energy-efficient solutions in its data centres
- CSC seeks to save energy and natural resources and to reduce its carbon footprint
- CSC guides and supports personnel in adopting environmentally friendly working methods.

Under the Energy Efficiency Act, major companies are required to perform a corporate energy review at four-year intervals. CSC's latest energy review was commissioned in 2015.

The services provided by CSC are mainly digital. In 2018, all electricity used by data centres and office facilities was renewable. The majority of the services we provide have been virtualised, resulting in lower server electricity consumption and resource usage than if the services were implemented using a corresponding number of physical devices.

## **Energy-efficient data centres**

CSC's Kajaani data centre is one of the most energy efficient in the world. The Modular Data Centre (MDC) introduced in 2012 achieved the world-class PUE figure (power usage effectiveness) of 1.04. Levels of up to 1.02 were achieved in Kajaani using a Bull system with warm-water cooling. Knowing this, the outlook is also good for the new supercomputer, which partly uses similar cooling technology.

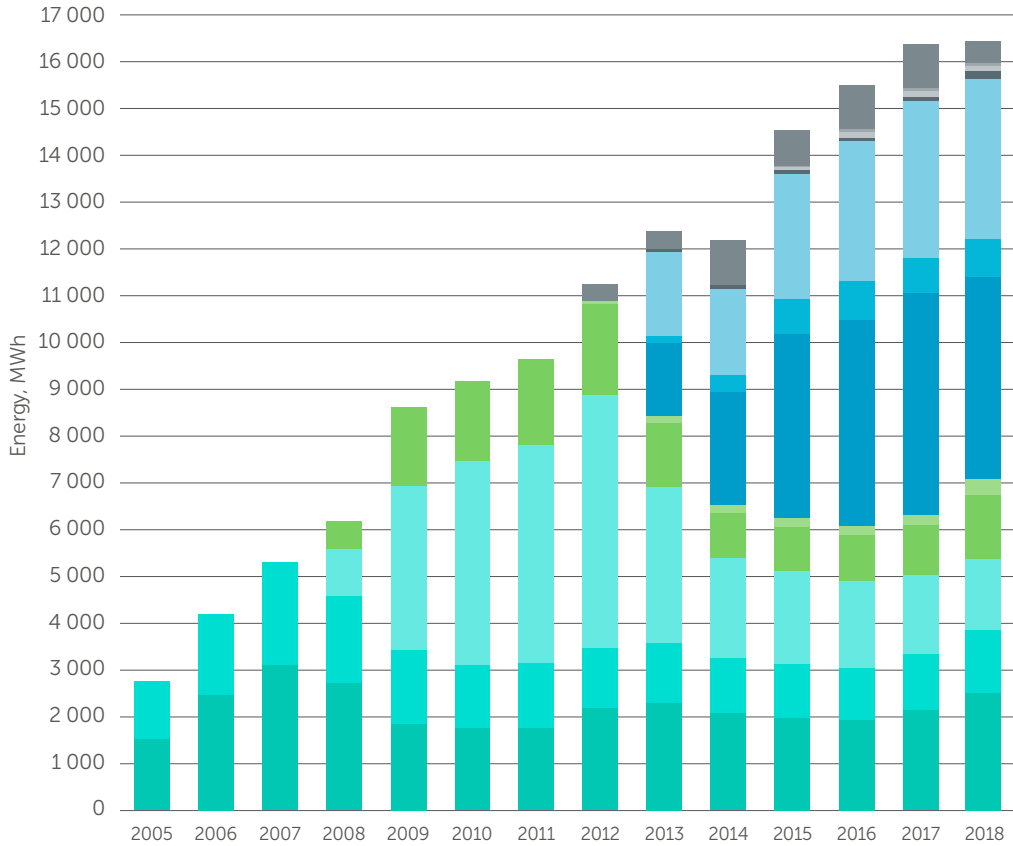
On a global scale, the energy efficiency of all our data centres is excellent (PUE values of 1.04–1.89), excluding one, whose reduced PUE value was due to its decreased utilisation rate. The utilisation rate of this data centre will improve in 2019 as the data centre arrangements planned in Espoo make headway. The general trend has been good up till now, and CSC believes that lower figures will again be reached next year. As the power use efficiency graph shows, CSC's development continues to be almost on par with the target (10%).

The use of cPouta and ePouta cloud services grew considerably in 2018. Measured by the memory capacity, the use of cPouta increased by approx. 50% and the use of ePouta by approx. 150%. Service capacity was added to as needed.

Another important aspect of energy efficiency is ensuring that all of the energy consumed is used on significant operations. The computing services CSC offers to Finnish research have a high usage rate and we employ such methods as scaling tests to ensure the efficient use of resources.

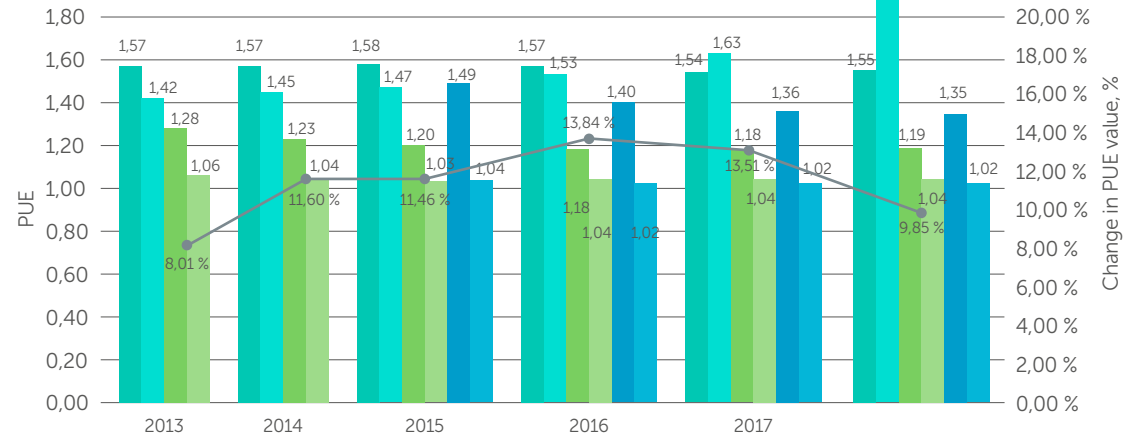
All of the electricity used by our data centres in 2018 came from renewable energy sources. All in all, CSC's energy consumption in data centres decreased slightly, the most important factor in which was the closing down of one supercomputer environment in early 2018 (Bull).

### CSC datacentre energy consumption 2005–2018



- Kajaani other
- Kajaani MDC2 Infra
- Kajaani MDC2 IT
- Kajaani MDC Infra
- Kajaani MDC IT
- Kajaani HPC Infra
- Kajaani HPC IT
- Keilaranta Archive
- Pohja Infra
- Pohja IT
- Espoo Infra
- Espoo IT

### CSC datacentre energy efficiency 2013–2018



- PUE Espoo
- PUE Pohja
- PUE Kajaani Sisu
- PUE Kajaani MDC
- PUE Kajaani MDC2
- PUE Kajaani Bull
- Change to 2010 (%)



### Environmental risks

Potential environmental risks at data centres are managed in accordance with current regulations. No environmental damage was reported in 2018.

The greatest environmental risks associated with CSC's operations relate to the handling of the gas mixtures, refrigerants and generator fuel oils used in the data centre infrastructure, and the disposal of decommissioned equipment. Data centre maintenance contracts oblige the suppliers to ensure that hazardous substances and materials are disposed of appropriately. Whenever possible, refrigerants and gas extinguishants are recycled during maintenance or repairs.

Clauses on the decommissioning of IT equipment are already contained in procurement contracts. Depending on these contracts, equipment may either be returned to the manufacturer or recycled separately.

## Environmental responsibility in other operations

CSC has improved the efficiency of space use in its facilities. The average efficiency of space use in offices is 14 m<sup>2</sup>/person. In multi-use offices, the figure is approx. 10 m<sup>2</sup>/person and in individual offices, less than 17 m<sup>2</sup>/person.

### Energy and water

Electricity consumption in CSC's offices totalled 329.1 MWh in 2018, which represents 2 per cent of our total electricity consumption. Electricity consumption per person dropped to less than 1 MWh/person.

CSC is not a major consumer of water. A precise figure for CSC's water consumption in Espoo cannot be given, as the property does not have lessor-specific water meters. Our data centres employ a closed loop water cooling system with minimal water requirements.

### Carbon footprint and travel

All of the electricity used at our data centres and offices in 2018 came from renewable energy sources that did not generate carbon dioxide emissions. Direct greenhouse gas emissions are only produced by the diesel aggregators used as a reserve power supply for data centres.

Air travel is CSC's most significant source of greenhouse gas emissions. Air kilometres in proportion to personnel numbers went down year-on-year. As in previous years, the district heating used in the facilities was the second largest source of carbon dioxide emissions.

Personal car use went up from the year before. CSC employees received kilometre allowances amounting to EUR 16,614.82 in total for driving 39,559 km, which

represents a slight year-on-year increase. (in 2017, EUR 13,578.34/33,118 km)

Domestic rail travel went up slightly from the year before to 108,148 km/EUR 11,875, or approx. 308 km/person (in 2017, 105,826 km/EUR 9,688). It should be noted that train ticket prices have generally gone down, and new ticket types have been introduced since the previous years.

Travel by taxi went down from the year before: in 2018, the costs of taxi travel totalled EUR 91,989.26 (in 2017, EUR 104,353.53). Using the coefficient EUR 1.81/km, this would be 50,823 km or 145 km/person.

CSC's role in the Finnish and international research infrastructure requires networking and, therefore, travel. We have sought to reduce travel by increasing opportunities for teleconferences and encouraging personnel to use public transport.

We have focused our travel-related procurements on government-tendered airline and accommodation services with specified environmental criteria.

### **Materials and waste**

In its procurements, CSC relies on Hansel framework agreements that take environmental perspectives into account. CSC's procurement policy also instructs employees to examine environmental factors at all stages, from planning to use and decommissioning.

Digital work processes are used to reduce printing and paper consumption. The default settings of multi-purpose equipment used in the offices are as environmentally friendly as possible (two-sided monochrome printing, automatic power saving mode).

CSC aims to sort wastes as far as possible, and an effort is made to recycle any usable goods.

CSC primarily acquires furniture and ICT equipment for the personnel through leasing agreements, which saves resources and reduces environmental loading. ICT equipment is returned to the leasing company after two to five years of use. No hazardous substances are used in our offices.

# Finances

CSC's purpose is to provide non-profit services to its shareholders. CSC does not engage in market-driven business activities. In accordance with our Articles of Association, we provide services to the organisations specified by our shareholders in the business areas determined by them. At CSC, financial responsibility means transparency, open financial management, and the provision of high-quality yet cost-effective services.

## Financial objectives and their attainment

In 2018, CSC focused on transparency of costs, good cost management and cost-effectiveness. The performance regarding cost-effectiveness and cost management was good in the past accounting period. Transparency and reporting to all stakeholders were also improved successfully.

Overall economic growth also helped to improve CSC's finances and paved the way for healthy growth. Financial growth for the financial period was positive, even exceeding expectations. Growth was achieved through expanding existing customer operations and new initiatives in various customer sectors.

The increased turnover also improved the result. Increasing the efficiency of internal operations kept the cost level in check. The relative cost level remained similar to previous years. Key indicators for CSC's financial performance and financial activities are presented in greater detail in the Financial Statements and Auditor's Report.

## Key financial indicators

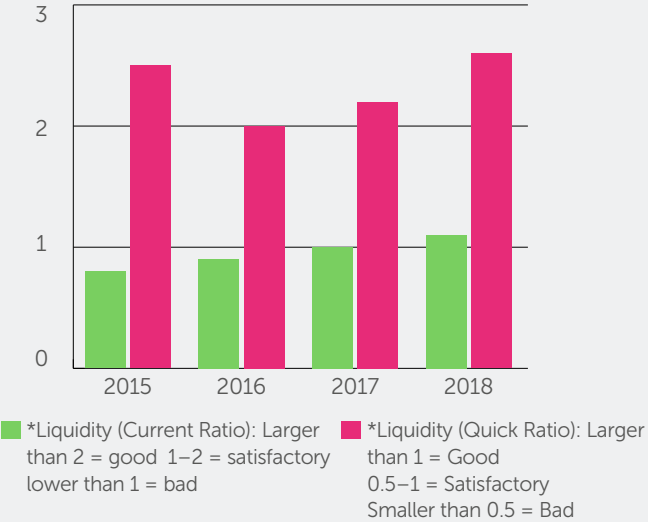
CSC's turnover in 2018 was EUR 44.9 million.

Key indicators	2018
Operating profit	3,90 %
Return on equity	31,30 %
Return on investment	39,40 %
Quick ratio	2,6
Current ratio	1,1
Equity ratio	33,00 %
Gearing	23,70 %

## Financial support from the state

Support	€	Purpose
Government subsidy	2,890 milj.	The government subsidy is intended for the development of computing service infrastructure, service concepts, and data warehouse services.
Investment support from the Ministry of Education and Culture	3,525 milj.	This support covers investments in the maintenance, monitoring and security of the state-owned and/or state-funded computational environment administered by the company.

**Funding**



**Capital adequacy**



### Cash flows to stakeholders

Stakeholders	€	Direct and indirect impact
Customers	Net sales 44.897 milj.	<b>Direct and indirect impact:</b> Through CSC, the Ministry of Education and Culture fulfils its obligation under the Information Management Act to promote cooperation and IT system interoperability in the fields of education, science, culture and public administration.
	Support from the EU, Tekes and Academy of Finland  4.081 milj.	CSC's customers are given access to scientific computing services, a world-class data network, and training and expert guidance in the use of supercomputers.  <b>Indirect financial impact:</b> CSC has an impact on the competitiveness of Finnish research and education.
Suppliers	-22.228 milj.	<b>Direct financial impact:</b> CSC primarily purchases goods and services from suppliers operating in Finland.  <b>Indirect financial impact:</b> Cooperation creates business opportunities and jobs for suppliers.
Personnel	-24.151 milj.	<b>Direct financial impact:</b> All of CSC's personnel are stationed in Finland. Salaries and bonuses have an impact on private consumption, and the taxes paid by personnel contribute to social well-being.  <b>Indirect financial impact:</b> CSC uses training and task rotation to enhance our personnel's expertise and performance. CSC personnel have unique expertise in areas such as scientific computing, data management, and storage services.
Public sector	-357,000	Taxes paid by CSC to the State
Support and donations given to non-profit organizations	0	In accordance with its Code of Conduct, CSC does not make donations, support non-profit organizations, or sponsor any type of group.
Shareholders	0	CSC does not pay a dividend. CSC's operating profit was transferred to retained earnings in its entirety.
Funding agencies	-11,000 21,000	Financial expenses Financial income
Result for the financial year	1.414 milj.	The profit for the financial year was transferred to retained earnings in its entirety.
Investments: depreciation	-823,000	Our own investments focus on the maintenance, monitoring and security of the state-owned and/or state-funded computing environment and data infrastructure administered by CSC.

# Reporting principles and formulae

CSC's Corporate Social Responsibility Report is published annually. The report covers all operations under CSC's control. Comparison data for the previous year is presented in accordance with the organisational model and operations of the year in question. Earlier key indicators have not been converted to reflect later changes.

As CSC does not have a direct or indirect holding of 50 per cent or more in any company, no information about companies in which CSC has holdings is included in our Corporate Social Responsibility Report.

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

## Formulae

### 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)

### 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. Designated HR management personnel collate the information 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 at 31 Dec) x 100%
- Accident frequency = (number of accidents 1 Jan–31 Dec) / (1,000,000 work hours)
- Sickness absence rate, % = (number of days of sickness absence 1 Jan–31 Dec) / (theoretical standard workings hours 1 Jan–31 Dec) x 100%

The Net Promoter Score (NPS) has been calculated as follows:

- NPS = (number of promoters - number of detractors)/(number of respondents) \* 100
- Customer responses (on a scale of 0–10) were classified as follows: 0–6 = detractors, 7–8 = passive, 9–10 = promoters

### Environmental responsibility

At our Espoo and Kajaani data centres, the energy consumed by infrastructure and IT systems is separately monitored. Energy efficiency is measured as a PUE value (Power Usage Effectiveness) as follows:

- PUE = (total energy used by the data centre) / (energy used by servers)

PUE does not provide a complete picture of energy efficiency, as the data centre's usage rate should be account for. However, being the most internationally used benchmark, PUE was chosen as a key indicator due to its comparability.

## Correspondence with the Government Resolution on State Ownership Policy

The following table compares the scope of CSC's corporate social responsibility reporting to the model defined by the Government Resolution on State Ownership Policy (3 November 2011). The table uses the following abbreviations to indicate where the relevant information may be found:

- FSP = Financial statements
- CSR = Corporate social responsibility report

ID	Reporting in accordance with the government resolution on state ownership policy	Included	Document and page	Additional information / deficiencies / exceptions
1	Organization, Corporate Governance, and operating principles			
1.1	Basic information	Yes	YVR 4	
1.2	Social responsibility management and operating principles	Yes	YVR 6	
1.3	Stakeholders and stakeholder dialogue	Partially	YVR 8–20	
2	Financial responsibility			
2.1	Financial responsibility management			
2.1.1	Financial objectives and their attainment	Yes	YVR 35–37, TP	
2.2	Financial key indicators			
2.2.1	Cash flow to stakeholders	Yes	YVR 37	Financial statements 31 Dec 2018
2.2.2	Support for non-profit organizations and sponsorship	No		CSC neither supports non-profit organizations nor sponsors any groups.
2.2.3	Financial support received from the State	Yes	YVR 35	
3	Personnel			
3.1	HR management			
3.1.1	HR management	Yes	YVR 18	
3.1.2	HR targets	Yes	YVR 18–19	
3.2	Number and breakdown of personnel			
3.2.1	Number of personnel	Yes	YVR 20	
3.2.2	Employment contracts	Yes	YVR 20	
3.2.3	Turnover	Yes	YVR 20	

3.2.4	Length of service	Yes	YVR 20	
3.2.5	Age structure	Yes	YVR 20	
3.3	Reorganizations and redundancies / Employer-personnel relations			
3.3.1	Redundancies and lay-offs	No		CSC made no redundancies or lay-offs.
3.4	Equality			
3.4.1	Gender breakdown	Yes	YVR 20	
3.4.2	Equality plan	Yes	YVR 19	
3.5	Remuneration			
3.5.1	Remuneration system and performance-based incentives	Yes	YVR 19	<a href="https://www.csc.fi/remuneration">https://www.csc.fi/remuneration</a>
3.6	Competence development and training			
3.6.1	Development discussions	Yes	YVR 19	
3.6.2	Training and competence development	Yes	YVR 19	
3.7	Wellbeing at work			
3.7.1	Personnel satisfaction	Yes	YVR 18	
3.7.2	Working capacity and wellbeing	Yes	YVR 18	
3.8	Occupational health and safety			
3.8.1	Accidents	Yes	YVR 18	
3.8.2	Sickness absences	Yes	YVR 20	
3.8.3	Occupational health	Yes	YVR 18	
4	The environment			
4.1	Environmental management			
4.1.1	Major environmental impacts of operations	Yes	YVR 31–34	
4.1.2	Managing environmental issues	Yes	YVR 31	
4.1.3	Environmental targets and their achievement	Yes	YVR 31–34	
4.2	Environmental key indicators			
4.2.1	Energy	Yes	YVR 32	
4.2.2	Air emissions	Yes	YVR 33–34	
4.2.3	Water	Partially	YVR 33	CSC is not a major consumer of water. Cannot be itemised. The property does not have lessor-specific water meters.
4.2.4	Waste	Partially	YVR 34	The property has a common waste area and the proportion generated by CSC cannot be measured.



4.2.5	Compliance and environmental expenses	No	YVR 33–34	No environmental damage.
4.2.6	Products and services	Yes	YVR 33–34	
4.2.7	Transportation	Yes	YVR 33–34	
4.2.8	Materials	Yes	YVR 34	
5	Social responsibility			
5.1	Local communities			
5.1.1	Impact on local communities	Partially	YVR 8, 14	
5.2	Bribery and corruption			
5.2.1	Measures and practices to combat bribery and corruption	Yes	YVR 6	
5.3	Political influence			
5.3.1	Political influence and support	Yes	YVR 6	CSC does not directly or indirectly support any political activities.
5.4	Restriction on competition			
5.4.1	Compliance with competition law provisions	Yes		
5.5	Compliance			
5.5.1	Compliance with legislation and regulations	Yes	YVR 6, 21	CSC has not been involved in legal proceedings or received any fines or sanctions.
6	Product responsibility			
6.1	Customer satisfaction			
6.1.1	Customer service and customer satisfaction	Yes	YVR 11–12	
6.2	Health and safety of products and services	No		CSC produces intangible services.
6.3	Product and service information and marketing communications	Yes	YVR 11, 21–29	
6.4	Protection of documents and privacy	Yes	YVR 16	
6.5	Sustainable consumption	Yes	YVR 31	
7	Human rights			
7.1	Human rights issues relating to operations	Partially	YVR 6	No clear human rights objectives have been set.
8	Supply chains			
8.1	Supply chain management			
8.1.1	Hankintaperiaatteen ja -politiikat	Yes	YVR 30	
9	Reporting principles and formulae			
9.1	Reporting principles	Yes	YVR 38	
9.2	Formulae	Yes	YVR 38	

# External interests of CSC's Board of Directors and Management Group in 2018

## CSC's Board of Directors



**MIRJAMI LAITINEN (b. 1948)**

Master of Administrative Sciences; Chair of CSC's Board of Directors since 2015.

In 2016–2017, Laitinen served as the chairperson of a working group preparing the establishment of the National Supervisory Authority. She has previously worked as a senior adviser for the Finnish Innovation Fund (Sitra), and as Director General, a Chief Director and in various managerial and senior inspector roles in the Finnish Tax Administration.

**Key concurrent positions of trust:**

Board Chairperson of ICT service centre for the counties Vimana Oy, Chair of Finnish Customs Advisory Board 2015–2018, member of the monitoring group for the Government Programme's digitalisation objectives and ICT development in the public sector (Digitalisation 2020, DigiNYT).



**ANU HARKKI (b. 1951)**

PhD, MBA, Senior Advisor; CSC Board Member since 2014.

Harkki's previous positions include Director, Business Solutions at the Natural Resources Institute Finland, Research Director at MTT Agrifood Research Finland, Program Director at Sitra, Managing Director of Life-science-man Ltd, and Research Director at Noviant Ltd. She has also worked for Cultor Food Science in New York, in several positions at Cultor Oyj, and as a research specialist at the Technical Research Centre of Finland (VTT).

**Key concurrent positions of trust:**

Climate Reality Leadership Corps, Climate Reality Speaker.



**MIKA HANNULA (b. 1968)**

DSc (Tech.), CSC Board Member since 2017.

Hannula has diverse experience of academic teaching, research and leadership roles. He also has long-standing experience of board work, and he has participated in developing a number of different organisations and foundations.

**Key concurrent positions of trust:**

Board Member of Dimecc Ltd, Member of the National Defence University's Advisory Board, Board Member of the Baltic Institute of Finland, Board Member of Academic Engineers and Architects in Finland TEK, Board Member of Technology Academy Finland, member of Turku Chamber of Commerce's industrial committee.



**PENTTI HEIKKINEN (b. 1960)**

MSc (Econ.), Stanford Executive Program; CSC Board Member since 2012.

Heikkinen is Board Chairman of Solidabis Oy. His previous positions include Managing Director of TietoEnator, CEO of Gateway Technolabs Finland Oy, several managerial roles at TietoEnator and its predecessor Tieto as well as in VTKK Government Systems Ltd, and as a director at CapGemini Finland.

**Key concurrent positions of trust:** Chair of Solidabis Oy, Chair of Linkity Oy, Chair of Auntie Solutions Oy, Board Member of Tecnotree Oyj, Chair of Gateway Technolabs Finland Oy, Vice Chair of CSC – IT Center for Science Ltd, Chair of Value Creation Oy.



**HEIKKI MANNILA (b. 1960)**

PhD, CSC Board Member since 2015.

Mannila is President of the Academy of Finland. He has previously worked as an Academy Professor and Vice Principal of Academic Affairs at Aalto University, and a professor at both the University of Helsinki and Helsinki University of Technology. He has also worked in industrial research in the USA, as a visiting professor at the Technical University of Vienna and as a visiting researcher at the Max Planck Institute for Informatics in Saarbrücken.

**Key concurrent positions of trust: -**



**VEERA SYLVIUS (b. 1974)**

MSc, MBA, CSC Board Member since 2018.

Sylvius has served as Managing Director of Space Systems Finland since 2010. Sylvius has also worked in expert roles at Ericsson, Sun Microsystems and the Finnish Meteorological Institute.

**Key concurrent positions of trust:**

Board Member in Space Systems Finland since 2011, Board Member in the Association of Finnish Defence and Aerospace Industries since 2017.



**JOUKO PAASO (b. 1956)**

DSc (Tech.), eMBA, CSC Board Member since 2016.

Paaso is Rector and CEO of Oulu University of Applied Sciences. His previous positions include Rector of Vaasa University of Applied Sciences as well as Director of Raahe Campus, fixed-term Professor of the Faculty of Information Technology and Electrical Engineering, and Director of Pehr Brahe software laboratory at the University of Oulu. He has also worked as a visiting researcher at the Fraunhofer Institute in Germany, a senior lecturer in computer science at the Raahe Institute of Computer Engineering, a researcher at the Technical Research Centre of Finland (VTT), and a software developer at LM Ericsson.

**Key concurrent positions of trust:**

Board Member of Nuorten Ystävät -palvelut Oy, Member of the Oulu Innovation Alliance's strategic steering group; Member of the Nordea Advisory Board.

## CSC Management Group 2018



**KIMMO KOSKI (b. 1964)**

DSc (Tech.), Managing Director of CSC since 2004.

Koski has previously worked in managerial positions at Nokia, and in managerial and specialist positions at CSC. He has also worked at the European Organisation for Nuclear Research (CERN) in Switzerland.

**Key concurrent positions of trust:**

Chair of EUDAT Collaborative data infrastructure project council,  
Member of expert panel of the Dutch eScience Centre.



**MINNA LAPPALAINEN (b. 1967)**

MSc (Econ.), Director, Marketing and Communications, in CSC's service since June 2014.

Lappalainen has previously worked in managerial roles at Taaleritehdas, Vattenfall, PlusTV and A-lehdet. She has also held managerial and expert positions at Sanoma Magazines and TietoEnator.

**Key concurrent positions of trust: -**



**TIINA KUPILA-RANTALA (b. 1963)**

PhD, MBA, Vice Managing Director of CSC since 2011

Kupila-Rantala joined CSC in 1996. In 2001, she was Project Manager at Nokia Networks. Before joining CSC, she worked as a research assistant in University of Helsinki's Department of Physics and as a systems analyst at Nokia Telecommunications.

**Key concurrent positions of trust: -**



**KLAUS LINDBERG (b. 1958)**

MSc (Tech.), Director, Information Management Services; in CSC's service since 1989.

Lindberg has previously held a number of different managerial positions at CSC. He has also worked as a research assistant at the Helsinki University of Technology.

**Key concurrent positions of trust: -**



**TOMASZ MALKIEWICZ (b. 1980)**

PhD, Senior Application Specialist, personnel representative. Has worked for CSC in project manager and specialist positions since 2011.

Malkiewicz has previously worked as a researcher at LPSC in Grenoble, France and at the University of Jyväskylä.

**Key concurrent positions of trust:** -



**PEKKA UUSITALO (b. 1964)**

MSc (Tech.), Director, Partnerships, in CSC's service since 2015.

Uusitalo has previously worked in managerial positions at Juniper Networks, Cisco Systems and Hewlett-Packard.

**Key concurrent positions of trust:** -



**PER ÖSTER (b. 1959)**

PhD, Director, Research Infrastructures, in CSC's service since 2007.

Öster has previously worked in managerial positions at the KTH Royal Institute of Technology in Stockholm, in consultant and specialist roles at Volvo Data AB, and as a researcher at the Chalmers University of Technology and University of Gothenburg.

**Key concurrent positions of trust:**

Member of the E-science evaluation panel at the Swedish Research Council (Vetenskapsrådet), Vice Chair of FIN-CLARIN consortium, Board Member of ELIXIR (European Life Science Infrastructure for Biological Information), Member of the Knowledge Exchange network's steering group.



**JANNE KANNER (b. 1973)**

M.A., Director, in CSC's service since 1999.

Kanner has worked at CSC in the roles of expert, project manager and development manager and, since 2004, in positions including Director, technology platform, and director responsible for business in different segments. He has previously worked as an ICT expert and lecturer at the University of Jyväskylä and in development tasks at Vapo Oy.

**Key concurrent positions of trust:**

Board Member of NORDUnet A/S



**TEEMU KIVINIEMI (b. 1981)**

MSc (Tech.), Director, Funet services and ICT platforms, in CSC's service since 2008.

Kiviniemi has previously worked at CSC in managerial and expert roles. Before joining CSC, he worked as programming course head assistant at Helsinki University of Technology and in maintenance and planning tasks relevant to servers and telecommunications in Ivalon Foto-Kone Ky and the Municipality of Inari.

**Key concurrent positions of trust:**

Board Member in Finnish Communication and Internet Exchange – FICIX association 2015-2016, Chair in 2017-2018. Deputy Board Member of NORDUnet A/S in 2015-2018.



**PEKKA LEHTOVUORI (b. 1973)**

PhD, Director, in CSC's service since 2001

Lehtovuori has previously worked as a senior scientist at FBD Ltd and a researcher at the University of Jyväskylä.

**Key concurrent positions of trust:** Board Chairman of the Nordic e-Infrastructure Collaboration (NeIC), expert member of the Computational Science Forum, vice representative for Finland on the European Grid Initiative (EGI) Council, ELIXIR Finland's Deputy Head of Node.



**TOTTI MÄKELÄ (b. 1973)**

MA, Director, in CSC's service since 2000.

Mäkelä has previously worked as a system expert and development manager at CSC.

**Key concurrent positions of trust:** -



**ANTTI MÄKI (b. 1978)**

MSc (Social Sciences), Director, in CSC's service since 2010

Mäki has previously worked in project manager and specialist positions at the University of Helsinki.

**Key concurrent positions of trust:**

Steering Group Member for the Joint Admission System for Higher Education project; Chair of the project group for the development of an e-service and decision-making system to support the steering of Finnish vocational education and training.



**KIMMO NIITTUAHO (b. 1966)**

MSc (Econ.), Financial Director, in CSC's service since 2003.

Niittuaho has previously worked in financial management positions for a number of companies, including Pirelli Oy, LM Ericsson and AKB Services.

**Key concurrent positions of trust:**

Board Member of Toppi Oy.



**TERO OLAVI TUONONEN (b. 1971)**

MA, student of Administrative Science, Chief Administrative Officer.

Nokia 1996–2006, CSC 2006– Development Manager, Director, Information Management, Director (ICTP), Chief Administrative Officer

**Key concurrent positions of trust:** -



**JARI RAJALA (b. 1971)**

MSc (Econ.), in CSC's service since 1997.

Rajala has been employed at CSC in managerial and expert roles in 1997–2004, as Administrative Director in 2004–2007, as Personnel Director in 2007–2011 and as Personnel Manager in 2011-.

**Key concurrent positions of trust:** -



**ANNA-STINA WESTMAN (b. 1973)**

DSc (Tech.), in CSC's service since 2014.

Westman has previously worked at CSC as Development Manager for research data services and assumed responsibility for open science services. Before joining CSC, she worked in the Management Information Services of Aalto University's development services and as a project manager in Aalto's research data system project.

**Key concurrent positions of trust:** -



**HETAMARI WOODS (b. 1967)**

MSc (Educ.), Director, Personnel Administration, in CSC's service since 2018.

Woods has previously worked in HR management roles at Valmet, Nokia and Amer Sports.

**Key concurrent positions of trust: -**



The first supercomputer to be introduced in the summer of 2019 is **PUHTI**

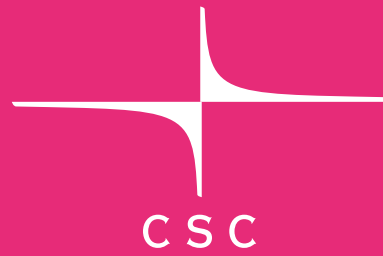




Second supercomputer to  
be deployed in summer 2019  
**ALLAS**

The supercomputer **MAHTI**  
to be deployed at the end of  
2019





**ICT Solutions for  
Brilliant Minds**