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# Artificial Intelligence 4.0 programme

Finland as a leader in twin transition  
– Final report of the Artificial Intelligence  
4.0 programme



Ministry of Economic Affairs  
and Employment of Finland

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4.0 programme

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## Artificial Intelligence 4.0

### Finland as a leader in the twin transition – Final report of the Artificial Intelligence 4.0 programme

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#### Abstract

In November 2020, Minister of Economic Affairs Mika Lintilä appointed a steering group led by Jussi Herlin to prepare an action plan for Finland to speed up the introduction of artificial intelligence and to promote the so-called fourth industrial revolution. The Artificial Intelligence 4.0 programme focuses on promoting the development and introduction of artificial intelligence and other digital technologies, targeting SMEs in the manufacturing industry in particular.

The vision of the programme is to make Finland a winner in the twin transition, which describes a simultaneous digital and green transition. To achieve this vision, three areas of development were identified:

- A) Strengthening high-level research on key technologies as well as development activities and investments
- B) Increasing the adoption of digital capabilities and technologies that accelerate the dual transition in industrial SMEs
- C) Making Finland an international frontrunner in the twin transition.

An action plan with monitoring indicators was established for the development areas. In addition, the steering group proposed the creation of a roundtable, which would be responsible for advancing the action plan on a strategic level after the end of programme's term.

Upon meeting the objectives of the Artificial Intelligence 4.0 programme, Finland's industry will be clean, efficient and digital in 2030. Digitalisation will be utilised in the promotion of industrial productivity and international competitiveness, and ethically sustainable solutions that accelerate the twin transition will be increasingly offered to the global market. The renewal of industry through investments in RDI and education will play a key role in achieving the green transition.

The steering group's first interim report "From start-up to implementation" was published in April 2021 and the second interim report "Finland to become a winner in a twin transition" in December 2021. This final report, "Finland as a leader in the twin transition", presents the key messages of the entire Artificial Intelligence 4.0 programme, formulated by a broad-based group of participants over a period of two years.

**Keywords** enterprises, business, artificial intelligence, digitalisation, industry

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## Tekoäly 4.0 -ohjelma

### Suomi kaksoisiirtymän suunnannäyttäjänä – Tekoäly 4.0 -ohjelman loppuraportti

<b>Työ- ja elinkeinoministeriön julkaisuja 2022:63</b>		<b>Teema</b>	Yritykset
<b>Julkaisija</b>	Työ- ja elinkeinoministeriö		
<b>Yhteisötekijä</b>	Tekoäly 4.0 -ohjelman alatyöryhmät, Demos Helsinki		
<b>Kieli</b>	englanti	<b>Sivumäärä</b>	34

#### Tiivistelmä

Elinkeinoministeri Mika Lintilä asetti marraskuussa 2020 Jussi Herlinin johtaman ohjausryhmän valmistelemaan toimenpideohjelman Suomelle tekoälyn käyttöönoton vauhdittamiseksi ja edistämään ns. neljättä teollista vallankumousta. Tekoäly 4.0 -ohjelmassa keskitytään erityisesti tekoälyn ja muiden digitaalisten teknologioiden kehittämisen ja käyttöönoton edistämiseen, kohdentuen valmistavan teollisuuden pk-yrityksiin.

Tekoäly 4.0 -ohjelman visioksi muotoutui ”Suomesta voittaja kaksoisiirtymässä”, jossa kaksoisiirtymällä tarkoitetaan yhtäaikaista digitaalista ja vihreää siirtymää. Vision saavuttamiseksi tunnistettiin kolme kehitysaluetta:

- Vahvistetaan kärkiteknologioihin kohdistuvaa korkeatasoista tutkimusta sekä kehitystoimintaa ja investointeja
- Kasvatetaan digikyvykkyksiä ja nopeutetaan kaksoisiirtymää kiihdyttävien teknologioiden käyttöönottoa teollisissa pk-yrityksissä
- Suomi näyttämään kansainvälisesti suuntaa kaksoisiirtymässä.

Kehitysalueille muodostettiin toimenpideohjelma seurantamittareineen. Lisäksi laadittiin ehdotus strategisen tason pyöreästä pöydästä vastaamaan toimenpideohjelman edistämistä ohjelman toimikauden päättymisen jälkeen.

Tekoäly 4.0 -ohjelman onnistuttua tavoitteissaan vuonna 2030 suomalainen teollisuus on puhdas, tehokas ja digitaalinen. Digitalisaatiota hyödynnetään teollisen tuottavuuden ja kansainvälisen kilpailukykyyn edistämässä ja kaksoisiirtymää kiihdyttäviä eettisesti kestäviä ratkaisuja tarjotaan globaaleille markkinoille enenevässä määrin. Teollisuuden uudistumisella TKI- ja koulutuspanostusten kautta on keskeinen rooli vihreän siirtymän saavuttamisessa.

Ohjausryhmän ensimmäinen väliraportti ”Käynnistysvaiheesta toteutusvaiheeseen” julkaistiin huhtikuussa 2021 ja toinen väliraportti ”Suomesta voittaja kaksoisiirtymässä” joulukuussa 2021. Tämä loppuraportti ”Suomi kaksoisiirtymän suunnannäyttäjänä” esittää koko Tekoäly 4.0 -ohjelman keskeiset viestit, jotka on muodostettu kattavan osallistujajoukon kanssa kahden vuoden aikana.

**Asiasanat** yritykset, elinkeinot, tekoäly, digitalisaatio, teollisuus

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## Programmet artificiell intelligens 4.0

### Finland föregångare inom den dubbla transformationen – Slutrapport för programmet artificiell intelligens 4.0

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#### Referat

Näringsminister Mika Lintilä tillsatte i november 2020 en styrgrupp som leds av Jussi Herlin för att bereda ett åtgärdsprogram för att påskynda ibruktandet av artificiell intelligens i Finland och främja den s.k. fjärde industriella revolutionen. I programmet artificiell intelligens 4.0 ligger fokus i synnerhet på att utveckla och ta i bruk artificiell intelligens och annan digital teknik, särskilt i små och medelstora företag inom tillverkningsindustrin.

Visionen för programmet artificiell intelligens 4.0. Var att göra Finland till en vinnare inom dubbel transformation dvs. digital och grön omställning samtidigt. Tre utvecklingsområden identifierades för att visionen ska kunna uppnås:

- Förstärka forskningen på hög nivå inom spetsteknik samt utvecklingsverksamheten och investeringarna.
- Utöka digitala färdigheter och användningen av teknik som främjar den dubbla omställningen i små och medelstora industriföretag.
- Göra Finland till en internationell föregångare inom den dubbla transformationen

För utvecklingsområdena tog man fram ett åtgärdsprogram med mätare för uppföljning. Därtill utarbetades ett förslag om rundabordsamtal på strategisk nivå för att ansvara för främjandet av åtgärdsprogrammet efter programperioden.

När programmet artificiell intelligens 4.0 nått sina mål 2030 är den finländska industrin ren, effektiv och digital. Digitaliseringen utnyttjas för att främja produktiviteten inom industrin och den internationella konkurrenskraften. Etiskt hållbara lösningar för att påskynda den dubbla transformationen erbjuds i allt större omfattning till den globala marknaden. Förnyande av industrin genom forskning, utveckling och innovationer samt satsningar på utbildning står i en central roll för att den gröna omställningen ska kunna genomföras.

Styrgruppens första delrapport "Från startperioden till verkställandet" publicerades i april 2021 och den andra interimrapporten "Finland vinnare i den dubbla transformationen i december 2021. Slutrapporten "Finland föregångare inom den dubbla transformationen presenterar alla centrala budskap, som skapats av deltagarna från många olika områden inom programmet artificiell intelligens 4.0 under två års tid.

**Nyckelord** företag, näringsgrenar, artificiell intelligens, digitalisering (process), industri

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# 1 Importance of Artificial Intelligence 4.0 programme in today's world

The boundaries of our planet and demographic changes arising from the ageing of the population, skills gaps and increasing migration force societies to define how and on what terms wellbeing is created. Industrial renewal through RDI and educational inputs is critical to achieving sustainable economic growth and green transition.<sup>1</sup>

'Making Finland a winner in twin transition',<sup>2</sup> the vision set out in the Artificial Intelligence 4.0 programme is more broadly linked to the objectives of building a competitive, climate-neutral and digitalised industry. As the vision was set out during an unprecedented pandemic, it highlights the efforts to reduce the vulnerability of industrial value chains and strengthen Europe's technological sovereignty and strategic autonomy. The Russian war of aggression has only added to the importance of these efforts.<sup>3</sup> The new world order questions long-standing ideas of the global market. These trends are reflected in closer transatlantic cooperation, growing inputs in critical capabilities and uncertainties about the global applicability of technical standards.

The need for a significantly more effective, long-term and consistent technology, industrial and innovation policy challenges us to boost the ability of the public and private sectors to speed up the change in Finland. Sluggish productivity growth in Finland calls for more effective focusing and implementation of technology, innovation and industrial policies. We are well placed to play a key role in a rapidly changing world by acting as a frontrunner in twin transition. We have talent, technological optimism and a high level of trust in society, which make Finland an ideal partner for a broad range of different actors.

Digital technologies are essential for boosting green transition, productivity and wellbeing. However, digital and green transitions are not automatically linked, and we must ensure that digitalisation is harnessed to promoting green transition. Digital

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1 European Commission: Industry 5.0 [https://research-and-innovation.ec.europa.eu/research-area/industry/industry-50\\_en](https://research-and-innovation.ec.europa.eu/research-area/industry/industry-50_en) Retrieved on 25 August 2022

2 Ministry of Economic Affairs and Employment (26 April 2021): Artificial Intelligence 4.0 programme First interim report: from launch to implementation stage. <http://urn.fi/URN:ISBN:978-952-327-899-8>

3 European Parliament: EU strategic autonomy 2013 – 2023: From concept to capacity [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2022\)733589#:~:text=EU%20strategic%20autonomy%20](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)733589#:~:text=EU%20strategic%20autonomy%20)



technologies leave a massive carbon footprint, which also requires technological advances and attention. Technological progress does not only define the interaction between humans and technology in a new way but also the manner in which humans act as groups. For example, it is anticipated that solutions based on distributed technologies emphasising privacy (such as web 3.0)<sup>4</sup> will significantly change the foundations of the economy. Internationally, the ethical perspectives of digitalisation are assuming a greater importance, and regulation impacting artificial intelligence and related technologies<sup>5</sup> is developing at a rapid pace. This provides Finnish companies with an excellent opportunity to become frontrunners in ethically sustainable technologies and operating models.

The low-carbon roadmaps prepared by sectoral federations in 2019<sup>6</sup> have been a unique project both nationally and internationally. They have allowed Finnish companies to pioneer the implementation of the ambitious climate targets set by Finland. Technologies critical to twin transition in individual sectors and links between them have been identified in the low-carbon roadmaps. The low-carbon roadmaps are also a good example of cooperation between private and public sectors. In fact, these roadmaps are already in the process of being implemented.

A broad range of different actors have been working to develop Finland's technology and industrial policy from a variety of different perspectives. The following four reports have been particularly important to the preparation of the final report: Sustainable economic growth and our future wellbeing,<sup>7</sup> Finnish technology policy in 2020s – A global leader through technology and information,<sup>8</sup> Finland's digital compass<sup>9</sup> and the Final Report of the Parliamentary Working Group on Research, Development and Innovation final report.<sup>10</sup> Together with the recommendations set out in the Artificial Intelligence 4.0 programme, the reports provide a comprehensive overview of the required action.

4 Sitra: 'Web 3.0 and progress towards a new internet – What is it about and what does it offer us?', 3 May 2022 <https://www.sitra.fi/en/articles/web-3-0-and-progress-towards-a-new-internet-what-is-it-about-and-what-does-it-offer-us/>. Retrieved on 25 August 2022

5 See for example: European Commission: A European approach to artificial intelligence <https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence> . Retrieved on 29 August 2022

6 Ministry of Economic Affairs and Employment: Low-carbon roadmaps 2035 <https://tem.fi/en/low-carbon-roadmaps-2035> . Retrieved on 25 August 2022

7 Ministry of Economic Affairs and Employment (2022): Sustainable economic growth and our future wellbeing (in Finnish, with English abstract) <http://urn.fi/URN:ISBN:978-952-327-599-7>

8 Ministry of Finance 2021. Finnish technology policy in 2020s – A global leader through technology and information (in Finnish, with English abstract). <http://urn.fi/URN:ISBN:978-952-367-692-3>

9 Draft for Finland's digital compass (in Finnish): <https://www.lausuntopalvelu.fi/FI/Proposal/Participation?proposalId=d77ee4a5-6d68-44cd-b8c1-0957ca01b2ac> . Retrieved on 19 August 2022

10 Finnish Government (2021): Final Report of the Parliamentary Working Group on Research, Development and Innovation (in Finnish, with English abstract) <http://urn.fi/URN:ISBN:978-952-383-516-0>

Many Finnish companies are frontrunners in developing sustainable solutions.<sup>11</sup> Finland has also established a strong position in a number of key technologies (5G/6G, artificial intelligence and quantum computing)<sup>12</sup> and using this position to build a sustainable welfare society and European technological sovereignty is a huge economic opportunity. Finland has expertise, talent and developers in the key areas of new technology applications. Finland is well placed to play an important role for its size in promoting fair twin transition in Europe and in global developments through international cooperation, and European Union institutions and networks. We must seize this opportunity.

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11 VTT's vision paper: Most promising technologies (2022) <https://www.vttresearch.com/en/vtts-vision-paper-most-promising-technologies>

12 Finnish Government 2022: Sustainable Growth Programme for Finland: Recovery and Resilience Plan. <http://urn.fi/URN:ISBN:978-952-383-694-5>

## 2 Summary: With the following proposals, Finland can speed up twin transition and benefit from it

Making Finland a sustainable winner in twin transition is the vision for 2030 set out in the Artificial Intelligence 4.0 programme. To make this vision a reality, programme participants have developed an action plan for 2030 with the support of the steering group. It contains

- four key objectives that Finland should achieve to make the vision a reality
- three cross-cutting development priorities in which inputs should be made to achieve the objectives and the indicators for monitoring progress
- a total of 11 measures that will make Finland a winner in twin transition

**This final report lists the key messages of the Artificial Intelligence 4.0 programme, which have been drafted in collaboration with a broad-based group of participants.**<sup>13</sup>

The parties that took part in the preparation of the final report are presented in Appendix 1.

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<sup>13</sup> Appendix 1: The parties involved in the preparation of the final report of the Artificial Intelligence 4.0 programme

# VISION 2030: MAKING FINLAND A WINNER IN TWIN TRANSITION

## OBJECTIVES



**Nature smart companies** will bring Finland a triple victory in sustainable development by 2035 by using digital technologies.



**We strengthen AI leadership** by investing in the development and introduction of key technologies



**More and more digitally advanced** Finnish industrial SMEs will reach top positions in global rankings



**Finland will become an increasingly important player** in the development and deployment of AI, data and industrial strategies of the EU



## DEVELOPMENT PRIORITIES

### Strengthening high-quality research on key technologies as well as development activities and investments

- 1 Creating a basis for successful RDI clusters through expertise and long-term inputs
- 2 Enhancing the impact of key technologies by creating a national RDI agenda speeding up twin transition
- 3 Allocating more public funding to technologies, products and services increasing the carbon handprint of digitalisation
- 4 Ensuring that Finnish companies are ideally placed to use high performance computing in their business operations

### Boosting digital skills and speeding up the adoption of technologies that accelerate twin transition in industrial SMEs

- 5 Establishing digital agents and digital development peer groups as well as a development forum for SMEs boosting cooperation and service matching
- 6 Launching industry 5.0 programme for SMEs
- 7 Preparing a growth programme for data economy
- 8 Developing micro-credentials and multisectoral learning material on the opportunities opened by

### Making Finland an international frontrunner in twin transition

- 9 Encouraging companies to strengthen their roles and impact in EU-level decision-making, RDI projects and networks
- 10 Strengthening Finland's position in transatlantic discussions on technology and trade policy matters
- 11 Exploiting the business opportunities created by twin transition so that Finnish companies can increase their global handprint

## MEASURES



## IMPLEMENTATION MEASURES

Strategic-level roundtable to advance the action plan

## 3 Development priorities and packages of measures

### Development priority A. Strengthening high-quality research on key technologies as well as development activities and investments

The objectives of the Artificial Intelligence 4.0 programme can only become a reality if research, development work and investments are focused on key technologies. Basic research on key technologies and transforming this research into solutions require a development-friendly environment and new types of innovation partnerships, to which providers of funding, research partners, and frontrunner companies commit themselves on a long-term basis. The following have been identified as the most important key technologies for Finland:<sup>14</sup>

- wireless networks
- artificial intelligence
- microelectronics and photonics
- quantum technology
- space technology
- smart manufacturing

As investments in artificial intelligence and other key technologies grow globally, Finland can only maintain its frontrunner position by significantly boosting inputs in new expertise, technological development and research infrastructure as well as in experimentation and testing environments. At the same time, it should also be ensured that inputs in top talent and key technologies speed up green transition.

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14 Ministry of Finance (2021): Finnish technology policy in 2020s – A global leader through technology and information. Publications of the Ministry of Finance 2021:30. <http://urn.fi/URN:ISBN:978-952-367-692-3>

### Measuring the development priority

- Public and private RDI inputs in key technologies will increase by an average of 30% each year. The current situation in this field should be assessed on the basis of the statistics produced by Business Finland and the Academy of Finland as well as the information supplied by the Technology Industries of Finland, higher education institutions and research institutes.
- More patent applications in key technologies will be submitted to the Finnish Patent and Registration Office.
- The success of Finnish technology products and solutions promoting twin transition in the global market will be monitored as part of overall technology exports.
- The handprint of export products based on key technologies will be monitored.
- In the Global Talent Competitiveness Index, Finland will move from the current seventh place to the top-three group.
- Ranking in Global AI Index: In the Talent Index, Finland will move from the current 13th place to the top-five group.

## Measure 1: Creating a basis for successful RDI clusters through expertise and long-term inputs

The creation of successful industrial RDI clusters requires more experts in key technologies, a match between these experts, companies and research as well as long-term research and development work. **The aim is to create a strong national RDI ecosystem and to achieve the status of an international frontrunner.**

Universities and other research organisations, national providers of RDI funding and ministries with steering powers should pledge to promote the research themes of the RDI Agenda (Measure 2) on a long-term basis and link them to **RDI structures** bringing together European top talent and promoting its application. These include

- AI, Data and Robotics Association (ADRA)
- European Laboratory for Learning and Intelligent Systems (ELLIS)
- AI Testing and Experimentation Facilities (AI TEFs)
- European Digital Innovation Hubs (EDIH)
- centre of chip excellence

RDI funding instruments will be developed to support research cooperation between the research field and companies as well as ecosystem-based operating models. More RDI funding will be made available and adapted to the needs of research institutes, while

**different types of long-term funding** intended to create new innovations and to boost the application of existing technologies and commercialisation of new innovations will be made available to start-ups. Long-term funding provides a better basis for cooperation between companies and research actors as there is room for more experiments and shared understanding of the opportunities opened up by technologies.<sup>15</sup> At the same time, work will be carried out to strengthen internationally attractive competence ecosystems that build cooperation between research and business actors by combining different sources of funding.

The implementation of the cross-administrative **Talent Boost** programme coordinated by the Ministry of Economic Affairs and Employment and the Ministry of Education and Culture will be given a high priority. The aim of Talent Boost is to create the basic prerequisites for attracting and retaining international talent, in addition to which pilot-based and other measures will be carried out under the auspices of Business Finland to attract and retain artificial intelligence and digital talent. If necessary, additional funding will be allocated to the Talent Hub service model for this purpose.

High-quality research clusters should be a key focus area in the work to achieve international impact and a frontrunner position. Finland will commit itself to strengthening research clusters on the basis built by FCAI and to attracting new actors to the cluster. To safeguard the competitiveness of European AI know-how, European actors (such as research institutes, companies and the European Commission) have established the ADRA PPP and the ELLIS Network (which includes the ELLIS units and institutes) to form a top-class global AI network. Finland should play an active role in ADRA PPP and, resources permitting, consider elevating the Helsinki ELLIS Unit to institute level as this would strengthen the connection between world-class artificial intelligence research and the Finnish business sector. It would also be a significant step towards making Finland more attractive to talent and international investments.

## Desired Impact

Successful research and industrial clusters boost investments in Finland made by domestic and international players. With these measures, technological expertise can be developed on a broad basis, which will help to attract top talent to Finland. Long-term funding will create an incentive-oriented innovation environment and internationally more competitive clusters.

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<sup>15</sup> VTT's vision paper: Most promising technologies (2022) <https://www.vttresearch.com/en/vtts-vision-paper-most-promising-technologies>

## Measure 2: Enhancing the impact of key technologies by creating a national RDI agenda to accelerate twin transition

The Ministry of Economic Affairs and Employment will coordinate the preparation of a national RDI agenda cross-cutting different sectors of society and arising from Finland's strengths to accelerate industrial twin transition. The agenda will lead to the launch and construction of key projects in microelectronics, network technology, robotics, quantum sector, edge computing and security technology as well as experimentation and testing environments for them. The selected key technologies play an important role in promoting twin transition<sup>16</sup> as they are based on such factors as improving processes and resource efficiency.

The agenda will be prepared in cooperation with a broad group of actors under the auspices of frontrunner companies and research institutes committed to its implementation. Examples of joint inputs by frontrunner companies and research actors include the 5G/6G network ecosystem, quantum ecosystem as well as autonomous maritime transport and smart mobile machinery ecosystems.

In concrete terms, artificial intelligence is linked to telecommunications in **edge computing**. Finland is excellently placed to be a leader in the development of edge computing and the **microelectronics** supporting it. To achieve this, participation and investments in consortia for future calls under the Digital Europe Programme will be added to the RDI agenda, and its national counterpart will be secured through co-financing.

In industrial manufacturing, artificial intelligence will be introduced in Finland in large scale in connection with **robotics and automation**. Based on the RDI agenda, investments by different actors can be channelled to research work and infrastructure combining artificial intelligence and robotics, which serve both top research and experiments performed by companies. Research inputs should be linked to European-wide cooperation and the infrastructure could be incorporated in the network of Testing and Experimentation Facilities (AI TEFs) of the Digital Europe Programme. RDI actors, such as Business Finland, will promote the development of microelectronics supporting robotics and support the participation of Finnish actors in the Important Project of Common European Interest (IPCEI) on Microelectronics<sup>17</sup> and in Chips JU.<sup>18</sup>

16 Ministry of Economic Affairs and Employment (2020): Summary of sectoral low-carbon roadmaps <http://urn.fi/URN:ISBN:978-952-327-796-0>

17 Important Project of Common European Interest on Microelectronics: <https://www.ipcei-me.eu/> Retrieved on 25 August 2022

18 Key Technologies Joint Understanding. Press Release (8 March 2022) [https://www.kdt-ju.europa.eu/sites/default/files/2022-02/KDT%20JU%20and%20the%20Chips%20Act%20\\_0.pdf](https://www.kdt-ju.europa.eu/sites/default/files/2022-02/KDT%20JU%20and%20the%20Chips%20Act%20_0.pdf)



Under the auspices of CSC – IT Center for Science Ltd, owned by the state and higher education institutions, Finland will also actively participate in future calls and other activities of EuroHPC.<sup>19</sup> This will ensure support for expanding research on **high performance computing and quantum technology** as well as sufficient inputs in computing in the future.

A promising quantum ecosystem has emerged in Finland,<sup>20</sup> and to ensure its continuous development on the basis of the RDI agenda, the Ministry of Economic Affairs and Employment will prepare, in a cross-sectoral manner, a national quantum strategy. In accordance with its international counterparts, the strategy will strengthen cooperation between research institutes and companies of various sizes. Using the strategy as a basis, the actors involved will prepare implementation programmes focusing on such matters as the quantum programmes of VTT and the cooperation with companies already under way.

Keeping up with advances in **cybersecurity technologies** requires extensive cooperation between companies and research institutes. Finland is home to advanced research on cybersecurity technologies and globally competitive companies.<sup>21</sup> A centre of expertise utilising key technologies and focusing on cyber security critical to comprehensive security will be jointly built by the Finnish Defence Forces, CSC, research institutes and the Finnish Information Security Cluster FISC.

### Desired Impact

Using the RDI agenda accelerating twin transition, the dialogue with key RDI policy steering instruments will be intensified and it will be ensured that the RDI policy is implemented on an ambitious and long-term basis. Based on the agenda, the capacity to anticipate technological advances will improve and the choices will primarily be made in those areas of RDI activities where Finland has significant advantages. At the same time, the operating environment will become more predictable and Finland will become more attractive to investments.

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19 Supported by the European Union, the European High Performance Computing Joint Undertaking (EuroHPC JU) will work to intensify European cooperation in the field of high performance computing.

20 VTT's vision paper: Most promising technologies (2022) <https://www.vttresearch.com/en/vtts-vision-paper-most-promising-technologies>

21 VTT's vision paper: Most promising technologies (2022) <https://www.vttresearch.com/en/vtts-vision-paper-most-promising-technologies>

### Measure 3: Allocating more public funding to technologies, products and services increasing the carbon handprint of digitalisation

Growing international calls to reduce emissions from digitalisation is a great opportunity for Finland thanks to our solid technology and carbon handprint expertise. Finnish expertise can be the key to creating the world's best digitalisation-related environmental and carbon handprint solutions. However, this requires determined efforts to boost development capabilities. While digitalisation offers solutions to increasing the carbon handprint in a variety of different sectors, its own carbon footprint is significant. According to Finland's climate and environmental strategy for the ICT sector,<sup>22</sup> energy subsidies should be channelled to companies to encourage them to develop solutions reducing the carbon footprint of the ICT infrastructure.

**Business Finland will boost its RDI funding and support for energy, growth and internationalisation and channel it to the development of digital processes, services and products increasing the carbon handprint of industrial companies.** This supports companies' nature smartness.<sup>23</sup> The work and recommendations of the green transition financing working group appointed in 2022 will be taken into account in the allocation of the funding.<sup>24</sup>

#### Desired Impact

The measure will create the basis for developing globally advanced technology solutions in Finland that increase the carbon handprint while at the same time, action is taken to reduce the emissions generated by digitalisation.

22 Ministry of Transport and Communications (2021): Climate and Environmental Strategy for the ICT Sector. Publications of the Ministry of Transport and Communications 2021:6 <http://urn.fi/URN:ISBN:978-952-243-595-8>

23 Nature smartness means that companies create economic, social and environmental benefits for society with their products and solutions and that the companies themselves act in an economically, socially and environmentally responsible manner.

24 Government of Finland (2022): The green transition working group is seeking ways to promote climate and environmental objectives and sustainable growth (in Finnish) <https://valtioneuvosto.fi/-/10623/vihrean-siirryman-rahoituksen-tyoryhma-etsii-keinoja-edistaa-ilmasto-ja-ymparistotavoitteita-ja-kestavaa-kasvua> Retrieved on 25 August 2022

## **Measure 4: Ensuring that Finnish companies are ideally placed to use high performance computing in their business operations**

Finnish companies will be provided with ideal opportunities to use high performance computing in their own business operations. In the long term, more and more companies will start applying modelling tools and other computing in their operations. This trend must be supported by lowering the threshold for introducing new solutions and expanding the available infrastructure and computing capacity.

In cooperation with CSC, Business Finland will carry out a campaign to make companies more aware of the benefits of high performance computing. The campaign will highlight companies' own experiences of how they have benefited from high performance computing. The campaign will raise awareness of CSC's expert support for companies, including support for companies in their cooperation with higher education institutions and research institutes, and of how to apply for funding for product development and innovation projects.

At the moment, 20% of the capacity of the LUMI supercomputer, which is part of the EuroHPC infrastructure, is reserved for companies. As the number of business use cases is increasing, Business Finland and CSC will also ensure that sufficient advanced computing capacity is available to Finnish companies, which creates a competitive advantage internationally.

### **Desired Impact**

Partly because of the new LUMI supercomputer provided as part of the EuroHPC infrastructure, the Finnish high performance computing infrastructure operated by CSC is of very high international standard. The measure will support companies' AI-based innovations by boosting the use of high performance computing infrastructure.

## Development priority B. Boosting digital skills and speeding up the adoption of technologies accelerating twin transition in industrial SMEs

The objectives of the Artificial Intelligence 4.0 programme can only be achieved if companies are able to utilise the business opportunities opened up by twin transition. Digital skills in SMEs should be significantly enhanced. Development and commercialisation of products, processes and solutions utilising technologies that promote twin transition should be accelerated. The aim of the measures is to boost productivity in SMEs and to increase the global carbon and environmental handprint.<sup>25</sup>

SMEs can only make effective use of the opportunities opened up by digitalisation in product and solution development, manufacturing processes, sales and marketing, after-sales services and other processes if digitalisation is understood as a broad-based process. Broad-based understanding of digitalisation requires better awareness, more support and more opportunities. It is essential to raise awareness of the development of digital and green business, potential of technologies, and good practices. At the same time, SMEs can only exploit the potential if they develop new expertise and engage in continuous learning.

### Measuring the development priority

- RDI inputs by industrial companies will account for an increasing proportion of GDP (OECD, Main Science and Technology Indicators).
- Industrial SMEs participating in RDI cooperation and networks will increase their turnover, profitability and productivity.
- Industrial SMEs will use technologies more extensively and they will be better placed to benefit from their impacts (such as the level of automation and robotisation) (Digital barometer).
- The ranking of Finnish companies in global sustainability indices will improve.
- Growth in CSC's HPC environment usage statistics: domestic usage (number of sessions, intensity).
- More industrial SMEs will take part in the data economy growth programme (Measure 8), more inputs will be made in the development of data-based business after the programme and the business itself will expand.
- Data market study, data market growth (European Commission, IDC). DESI Index: In the indicator measuring the use of AI in enterprises, Finland will remain number three or improve its position (2021).

25 VTT 'Carbon handprint evolved into an environmental handprint' <https://www.vttresearch.com/en/news-and-ideas/carbon-handprint-evolved-environmental-handprint-vtt-and-lut-developed-positive>, retrieved on 14 September 2022

## Measure 5: Establishing digital agents and digital development peer groups as well as a development forum for SMEs boosting cooperation and service matching

Industrial SMEs are at the core of the Finnish economy. Finland's success in twin transition largely depends on how these companies are able to use new technology to boost their productivity, improve their competitiveness and reduce their carbon footprint. The growth of SMEs is often hampered by scarce resources and lack of expertise. Many SMEs are also unfamiliar with the services supporting digitalisation and innovation and their providers and finding a suitable solution or partner is not always easy. The following three schemes (digital agents, peer groups for digital development and the SME development forum) are intended to eliminate these bottlenecks and speed up the renewal of the industrial SME sector.

### Digital agents

In cooperation with stakeholders, actors in the administrative branch of the Ministry of Economic Affairs and Employment will launch digital agent activities for industrial SMEs. The agents would review the needs for digital development and investments in SMEs and guide companies towards suitable services and solutions, including the peer group activities presented in this report. The development and consolidation of digital agent activities will be carried out in cooperation with business operators and other stakeholders using the pilot carried out as part of the WORK2030 programme in autumn 2022 as a basis.

### Digital development peer groups

In cooperation with stakeholders, actors in the administrative branch of the Ministry of Economic Affairs and Employment will launch peer group activities focusing on digital development in industrial SMEs. Tried and tested peer learning models and the digital agent activities presented above will be used. In peer group activities, SMEs use peer learning methods to share experiences and expertise in digital development projects and investments as well as lessons learned from them. Peer group activities are developed and consolidated in cooperation with business operators and other stakeholders.

### Development forum

In cooperation with stakeholders, the Ministry of Economic Affairs and Employment and actors in its administrative branch will establish a development forum for industrial SMEs to promote digital development, green transition and innovation activities in SMEs. The purpose of the development forum is to act as a structure familiarising SMEs with the currently fragmented service offerings and guide SMEs through the labyrinth of ecosystems and services (such as research, development, innovation and learning infrastructures). The forum can also act as a structure connecting European Digital

Innovation Hubs (EDIH) that serve SMEs established in Finland. The forum itself should not act as a service provider, but rather as an impartial facilitator and builder of a better match between supply and demand.

### Desired Impact

As a result of the **digital agent activities**, investments by industrial SMEs in digital and green technology will grow and will be channelled more appropriately. The administration and service providers will receive a more detailed picture of digitalisation in industrial SMEs and the bottlenecks facing the sector. There will be a better match between SMEs and actors providing digital development services, while at the same time, co-creation and offerings by companies will increase. SMEs will become more digitalised, the competitiveness, productivity and sustainability of companies will be enhanced and wellbeing at work will improve. The competitiveness of industrial subcontracting chains and value networks will increase.

**Peer group activities** will result in more digital development projects for industrial SMEs and investments and their success rate will increase, which will boost the sustainable competitiveness of the industrial SME sector. SMEs learn from the experiences of companies struggling with similar digital development issues and challenges and gain strength for their own development activities. By taking part in peer group activities, SMEs can learn from the experiments of other companies and find partners among the peer companies.

The need for a **development forum** arises from the need for new talent and for updating existing skills as a result of twin transition. The development forum will improve the match between SMEs, digital developers and actors offering innovation services, boost cooperation between service providers and enhance the impact of the activities. SMEs will become more digitalised, in addition to which instruments promoting circular economy and other matters boosting sustainable development will find new users. SMEs will be provided with better structures steering them towards twin transition.

## Measure 6: Launching Industry 5.0 programme for SMEs

Business Finland will continue inputs in RDI funding and international growth similar to the Sustainable Manufacturing programme, which will end in 2023, and its focus will be on enhancing the productivity and environmental sustainability of industrial SMEs.<sup>26</sup> The inputs should focus on significantly boosting digital skills and on both aspects of environmental sustainability (strengthening companies' own footprint and business handprint). Attention should be paid to the design and commercialisation of new products and solutions utilising green digital technologies and on placing them on the international market. Encouraging SMEs to extensively cooperate with large companies and other frontrunners would be particularly beneficial in the work to achieve these aims. Companies should also be supported in their efforts to engage in close international cooperation and, in particular, encouraged to exploit the potential of European cooperation in this field. Because of the scale of the challenges associated with the industrial twin transition and the large number of companies involved, the inputs should be long-term and last for at least five years.

### Desired Impact

The projects receiving funding will increase the carbon handprint, digital skills, productivity and international dimension of SMEs. The impact will arise from the new internationally competitive products and solutions created in the projects.

## Measure 7: Preparing a growth programme for data economy

A growth programme will be launched to increase the utilisation of industrial data. Business Finland or another actor close to companies will coordinate a programme in which companies, start-ups and research actors of different sizes join forces to speed up the creation of a responsible data economy in Finland. The programme will strengthen companies' capacity to utilise data in an effective and sustainable manner to improve the efficiency of business processes and to develop products and services. As part of the growth programme, companies will be offered information, expertise, tools and incentives to build and experiment data-utilising business models.

The programme will strengthen companies' understanding and their capacity to participate in the utilisation of data platforms and data spaces of the EU and international data platforms as well as in the development of components and use

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<sup>26</sup> Industry 5.0 provides a vision of industry that aims beyond efficiency and productivity as the sole goals, and reinforces the role and the contribution of industry to society. [https://research-and-innovation.ec.europa.eu/research-area/industry/industry-50\\_en](https://research-and-innovation.ec.europa.eu/research-area/industry/industry-50_en) Retrieved on 29 September 2022

cases. The programme will increase companies' awareness of developments in the regulatory environment and their ability to boost their competitiveness by using data in a responsible and ethical manner. Where applicable, the programme is based on Sitra's project Roadmap for a Fair Data Economy<sup>27</sup> and the concepts created in the pilots of Sitra's IHAN-business programme<sup>28</sup> and the Data Accelerator of the Technology Industries of Finland.

### Desired Impact

The growth programme for data economy will support companies in developing data-based business. The programme will strengthen the soft infrastructure of the data economy and boost companies' expertise and awareness of value creation in the data economy so that they can enhance their competitiveness. The foundations built in the programme will allow Finnish companies to act as frontrunners of a responsible data economy, which is growing in significance.

## Measure 8: Developing micro-credentials and multisectoral learning material on the opportunities opened up by twin transition

The recently established Service Centre for Continuous Learning and Employment SECLE (which is jointly managed by the Ministry of Education and Culture and the Ministry of Economic Affairs and Employment) or other competence development actor will support education providers selected in an open call procedure for two years in competence module and micro-credential pilots, in which the proactive approach used by working life partners of universities of applied sciences will be used to involve companies. SECLE will have the promotion of twin transition and the acquisition of the competence development solutions required for the work as its permanent focus area.

Teaching and training organisations will be encouraged to create flexible low-threshold micro-credentials, competence modules leading to them and learning material in cooperation with trade unions and central government. This will make companies' employees more aware of the opportunities arising from twin transition and its impact on the companies' operating environment. The modules and micro-credentials comprise two parts: artificial intelligence and digitalisation as well as green transition and bigger carbon handprint.

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27 Roadmap for a Fair Data Economy <https://www.sitra.fi/en/topics/roadmap-for-the-data-economy/> Retrieved on 1 September 2022

28 IHAN-business programme <https://www.sitra.fi/en/projects/ihan-business-programme/> Retrieved on 1 September 2022



In addition to technological understanding, the first part also covers a wide range of different business and human sciences perspectives, including the ethical sustainability of artificial intelligence. International examples will be used in the planning of micro-credentials.

The learning contents will be prepared so that they support the individual goals of the students in working life, providing them with new opportunities. This will also require communication with employers so that the skills of the employees that have undergone the training can be utilised. Companies will be encouraged to tell about their experiences, while examples of the added value that the individuals with micro-credentials have brought to the organisation will be highlighted. Learning contents will be continuously updated and they will be adapted to market needs and changes in society.

### Desired Impact

Training new experts will not close the skills gap facing Finnish industry. In accordance with the continuous learning model, employees are actively encouraged to update their skills so that companies can better keep up with the process of twin transition and the opportunities it brings.

## Development priority C. Making Finland an international frontrunner in twin transition

Finland's role as a global frontrunner in twin transition should be strengthened through European cooperation and transatlantic relations. The market for solutions helping to achieve twin transition is growing at an increasingly rapid pace. In Europe, investments are made to promote twin transition in a broad range of different sectors and in global scale, many countries have set their own carbon neutrality targets. From the perspective of Finland's competitiveness, it is essential that Finnish companies aim for international growth by making investments and innovations based on twin transition.

Finland will play a role in the drafting of European artificial intelligence, data and industrial strategies and measures and should focus domestic inputs in an optimum manner. We need a shared and continuously updated influencing agenda helping us to achieve visibility and exert influence at the EU level. Finnish companies and researchers should be extensively involved in key international networks, partnerships and influencing roles as well as receive funding for projects promoting twin transition. Ambitious implementation of low-carbon roadmaps prepared by industrial actors should be the main instrument to highlight Finland's frontrunner role in digitalisation and green transition in global scale.

**Measuring the development priority**

- Finland's position in the WEF Global Competitiveness Index will rise from the current eight place to the top three group. (2022).
- The number of Finns working in key EU roles and networks promoting twin transition will increase.
- There will be an increase in the number of Finns working as coordinators in European RDI and investment projects and programmes and in top positions in institutes.
- Finland will receive a larger share of the funding provided from EU programmes and the number of Finnish SMEs receiving EU funding will increase.
- Finland will be mentioned more frequently in connection with EU reports and Union decision-making.
- More solutions promoting twin transition will be offered by companies operating in Finland and the business based on them will grow.
- The share of EU investments in artificial intelligence and green transition channelled to Finland will increase.

**Measure 9: Encouraging companies to strengthen their roles and impact in EU-level decision-making, RDI projects and networks**

Ministries will intensify strategic cooperation between the private and public sector in EU matters. At the same time, companies are encouraged by Business Finland and other actors to strengthen their role and impact in RDI projects and programmes such as Horizon Europe and Digital Europe as well as networks. This requires the identification of themes and networks relevant to the companies and the ability to tackle them in a timely manner. Promoting the interests of companies in decision-making at EU level is also essential. Business organisations and persons in influential positions in EU institutions play a key role in this respect.

The aim is to increase the number of Finns serving in roles identified in the programme in which effective influence on digitalisation in the EU can be exerted. Finland will also propose the appointment of a high-level 'AI Envoy' under the next Commissioner responsible for the industrial or digital internal market and will work to ensure that a Finn will be selected for the role. The AI Envoy's task would be to mobilise companies and other actors in the sector to promote artificial intelligence horizontally in different industrial sectors and society at large and to promote Europe's global AI competitiveness.

A playbook for working in EU networks has been published on Business Finland's website.<sup>29</sup> The book, compiled during the programme, supports the efforts of companies and other actors to participate and play an influential role in the process and lowers the threshold for applying for funding.

### Desired Impact

The impact of Finnish companies in the EU will increase and Finland will play a significant role in the European community in the themes, value networks or ecosystems selected for the Artificial Intelligence 4.0 programme.

## Measure 10: Strengthening Finland's position in transatlantic discussions on technology and trade policy matters

Finland is excellently placed to participate and play an influential role in transatlantic technology and trade policy discussions in selected sectors. The following themes have been selected as spearheads of international impact in the Artificial Intelligence 4.0 programme:

- high performance, edge and quantum computing
- connectivity
- sustainable artificial intelligence
- cyber security competence

Finland's positive image and positive media coverage as well as our good rankings in international comparisons will be used in the discussions to promote our role.

Influencing requires continuous identification of emerging themes and choices. Companies, research organisations and the Ministry of Economic Affairs and Employment will, in cooperation with industrial actors, identify and assess new themes and, if necessary, utilise the [coaching model and procedure created in this programme](#).<sup>30</sup> In this manner, public and private sector actors can jointly prioritise and proactively promote themes benefiting Finland.

<sup>29</sup> Business Finland (2022): EU network playbook (in Finnish) <https://www.eurahoitusneuvonta.fi/ajankohtaiset/uutiset/2022/vaikutavuutta-verkostoilla-eu-verkosto-pelikirja-on-julkaistu>

<sup>30</sup> AI40 Coaching model for influencing in EU (in Finnish) <https://ai4point0criteria.vtt.fi/> Retrieved on 25 August 2022

## Desired Impact

Though a small country, Finland plays an important role as a global frontrunner in artificial intelligence and digital technologies. This role will be further strengthened, giving Finnish companies better access to both EU and transatlantic markets.

## Measure 11: Exploiting the business opportunities opened up by twin transition so that Finnish companies can increase their global handprint

With the help of new technologies and digital solutions, Finnish companies are not only able to reduce their own carbon footprint but can also offer other actors global-scale low-carbon solutions (carbon handprint) and solutions that protect the environment in a comprehensive manner (environmental handprint). In the targeted state, Finnish industry is competitive, clean and digitalised, while green solutions provide Finnish companies with a significant competitive advantage. The market for low-carbon solutions is growing at an increasingly rapid pace, which opens up significant business opportunities for Finnish companies.

Finnish actors and companies will be proactively involved in a process in which more and more technologies, products and services with positive climate impacts are developed and the measurement of these impacts becomes more common. Handprint thinking will be highlighted as one of the priorities of industrial policy and climate and energy policy as well as a factor guiding RDI activities. As a result, both public organisations and companies will highlight Finnish handprint work on different forums. Examples of this include the Carbon Neutrality Empowered By Handprint project coordinated by VTT, CLC's International Carbon Handprint Award initiative and the participation of companies, industrial actors, VTT and the Ministry of Economic Affairs and Employment in expert groups supporting the implementation of the industrial strategy of the EU and the management of Horizon Europe partnerships.

Finland's low-carbon roadmaps and the carbon handprint included in them have attracted positive global attention. The Climate2035 work, led by the Confederation of Finnish Industries, should be pursued in an ambitious manner so that it can achieve maximum international visibility. The Confederation of Finnish Industries will implement an extensive five-year enterprise-driven programme speeding up the implementation of low-carbon roadmaps. The focus areas of the programme are

- circular economy
- clean energy production and sectoral integration
- solutions encouraging twin transition in industries
- links between digital and green transitions

Companies will be proactively involved in the programme. The programme will be implemented with national funding, which will enable demonstrations and pilots as part of the programme.

### **Desired Impact**

Finnish companies are extensively represented in global value chains and develop sustainable and nature smart products and services for domestic use and export. Finland is a frontrunner in developing the handprint concept. Broad recognition and a strong status should be sought for handprint as a green indicator in the global environment through target-oriented influencing, communication and international standardisation.

## 4 Strategic-level roundtable to advance the action plan

Making Finland a sustainable winner in twin transition is the vision for 2030 set out in the Artificial Intelligence 4.0 programme. To achieve the vision, programme participants have developed an action plan for 2030 (described above) with the support of the steering group. The benefits of the action plan cannot be realised unless the initiatives created during the programme continue to receive the support and guidance they need after the conclusion of the programme in spring 2023. Public funding and cooperation between stakeholders focusing on the needs identified in the action plan should be ensured on a long-term basis.

Coordination between companies, public administration and research institutes requires significantly more inputs. The existing structures and operating models of central government, such as the coordination group for digitalisation,<sup>31</sup> can be utilised in the implementation of the action plan but there is a risk that the measures identified in this and other programmes will remain unconnected. Coordination between individual actors can ensure that the development of business operations, technology and expertise support each other. There is a clear common desire in Finland to be a frontrunner in twin transition. This desire should be fostered by means of continuous interaction between key actors.

***We propose that the Ministry of Economic Affairs and Employment, its administrative branch and stakeholders establish a strategic-level roundtable focusing on industrial twin transition and a secretariat supporting the work to guide the technological and industrial agenda and roadmap.***

All stakeholders involved in the steering and implementation should be represented in the roundtable process: key industrial ecosystems, industrial employer organisations and trade unions, entrepreneurs, research, education, funding and ministries. The task of the roundtable is to anticipate industrial change needs, to monitor the implementation of the technology and industrial agenda and to activate implementation-related measures.

<sup>31</sup> Coordination group for digitalisation <https://vm.fi/en/coordination-group-for-digitalisation>. Retrieved: 25 August 2022

The proposal for a strategic-level roundtable is in line with the other proposals and initiatives to develop technology and industrial policy steering. In its report,<sup>32</sup> the Finnish Technology Advisory Board identified ways to support the promotion of technology policy through reforming information and technology policy steering structures. Finland's digital compass<sup>33</sup> also provides an instrument to steer digitalisation. The aim of the digital compass is to support the prioritisation of central government measures, the allocation of resources and the assessment of societal impact as well as the assessment of Finland's position in relation to international developments. An arrangement similar to the roundtable proposal has also been prepared as part of the Sustainable Industry X initiative. Sitra's roadmap focusing on the data economy is also an example of a process that has a clear interface with the strategic-level roundtable.

For the evaluation, development and implementation of the action plan created in Artificial Intelligence 4.0, the technology and industrial policy steering structures should be provided with a continuously updated situation picture of the achievement of the objectives, key business and political bottlenecks and the changing operating environment. The strategic-level roundtable is an excellent way to do this.

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32 Ministry of Finance (2021): Finnish technology policy in 2020s – A global leader through technology and information <http://urn.fi/URN:ISBN:978-952-367-692-3>

33 Draft for Finland's digital compass, page 12: <https://www.lausuntopalvelu.fi/FI/Proposal/Participation?proposalId=d77ee4a5-6d68-44cd-b8c1-0957ca01b2ac> . Retrieved on 19 August 2022

# Appendixes

## Appendix 1: Steering group, secretariat and thematic working groups



## Appendix 1: Steering group, secretariat and thematic working groups

### Steering group

Chair: Jussi Herlin, Kone Corporation

Vice Chair: Ilona Lundström, Ministry of Economic Affairs and Employment

### Members

Cristina Andersson, Airawise Oy

Milja Köpsi, Mimmit koodaa

Minna Lanz, Tampere University

Anni Ronkainen, Kesko Corporation

Teemu Roos, University of Helsinki

Markku Räsänen, IQM Finland Oy

Samuli Savo, Stora Enso Oyj

Ville Miettinen, Varjo Oy

Eeva Raita, Futurice

Moaffak Ahmed, venture capitalist

### Secretariat

Satu Vasamo-Koskinen, Ministry of Economic Affairs and Employment

Riikka Virkkunen, VTT Technical Research Centre of Finland Ltd

Toni Mattila, Business Finland

Kristine Alanko, Ministry of Economic Affairs and Employment

### Thematic working groups

1. SMEs' digital capabilities and innovation cooperation, Chair: Joonas Mikkilä, The Federation of Finnish Enterprises
2. Effective EU cooperation, Chair: Samuli Savo, Stora Enso Oyj
3. Technology leadership, Chair: Teemu Roos, University of Helsinki
4. Digital green transition, Chair: Cristina Andersson, Airawise Oy
5. Communication and making sense of the digital transition, Chair: Eeva Raita, Futurice

## Experts of thematic working groups

Alexander Bargum, Group CEO, Algol  
 Anita Silanterä, Chief Specialist, Ministry of Economic Affairs and Employment of Finland  
 Arto Pussinen, Senior Director, Business Finland  
 Enni Saikkonen, Communications specialist, Ministry of Economic Affairs and Employment of Finland  
 Harri Junttila, Editor in Chief, Alma Talent  
 Harri Nieminen, Co-creation manager, VTT Technical Research Center of Finland  
 Heikki Ailisto, Research Professor, VTT Technical Research Center of Finland  
 Heikki Mannila, Professor, Aalto University  
 Heini Wallander, Senior Business Advisor, Business Tampere  
 Jaakko Hirvola, CEO, Technology industries Finland TIF  
 Janne Leinonen, Manager, ABB Robotics & Discrete Automation, ABB Finland  
 Jonna Lehtinen, Head of Development, Ministry of Economic Affairs and Employment of Finland  
 Joonas Mikkilä, Head of Digital and Educational Affairs, The Federation of Finnish Enterprises  
 Kaisa Juortamo, CEO, Milltamo Oy  
 Kaisa Soro-Pesonen, Head of Brussels office, Confederation of Finnish Industries  
 Kaisa Väänänen, Professor, Tampere University  
 Katriina Anttila, CEO, Kasvuryhmä Suomi ry  
 Matti Hellgrén, Managing Director, IoT Forge Foundation  
 Mervi Karikorpi, Head of EU Innovation and Industrial Policies, Technology Industries of Finland TIF  
 Pekka Lehtovuori, Director, CSC - IT Center for Science  
 Pertti Lukander, Head of Technology Vision, Nokia Mobile Networks  
 Petri Myllymäki, Vice-Director, Finnish Center for Artificial Intelligence  
 Petri Räsänen, Director, Council of Tampere Region  
 Petri Vilén, Creative Director, Spjinverse Oy  
 Piia-Noora Kauppi, CEO, Finance Finland  
 Pipsa Lotta Marjamäki, Program Director, KELA  
 Raimo Voipio, Vice Chair of the Board, Vaisala Oyj  
 Rasmus Roiha, CEO, Finnish Software and eBusiness Association  
 Rauno Hatakka, Senior Ecosystem Lead, DIMECC  
 Sanna Kulmala, Program Director, Work2030-ohjelma  
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 Susanna Pirttikangas, Research Director, University of Oulu  
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 Tellervo Kylä-Harakka-Ruonala, Independent Expert  
 Tero Ojanperä, Co-founder and Chairman, Silo AI  
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Timo Nurmi, Head of Communications, strategy and sustainability, Posti Group Oyj

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