CTO FORUM

CTO Survey 2020
Leading green and digital growth

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Pekka Koponen
Spinverse Oy

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Technology Industries of Finland

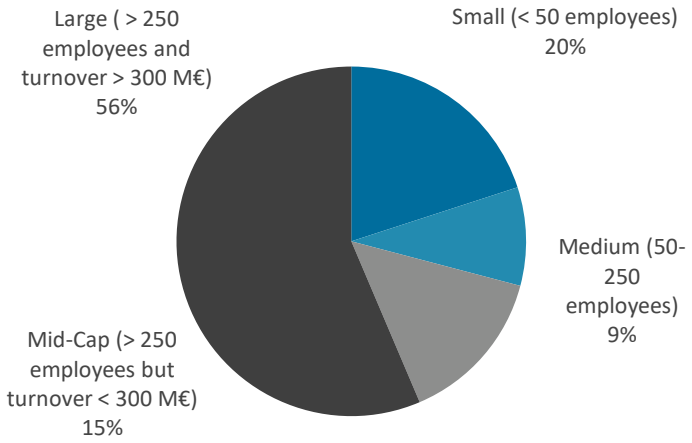
BUSINESS FINLAND

CTO Survey - Methodology

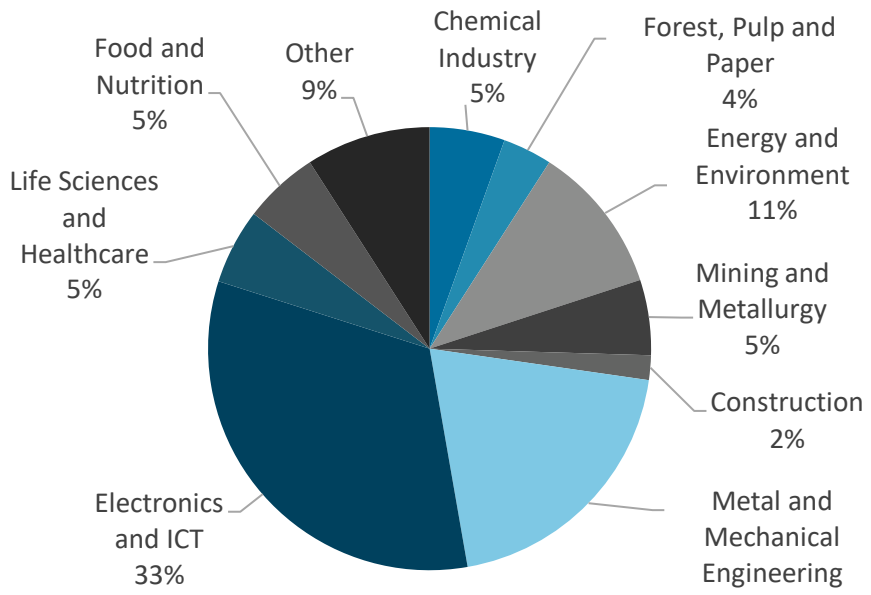
- The CTO survey has scanned the opinions and important signals from the Chief Technology Officers in Finland since 2010, the results raising interest not only among the CTOs themselves but also among other decision-makers and the media
- In the renewed concept the preliminary survey results were further discussed in the virtual CTO Forum and the focus was on those topics that the CTOs find the most relevant. The virtual CTO Forum was organised 10.11.2020.
- Timeline for the Survey:

The survey respondents comprehensively represent the Finnish industry

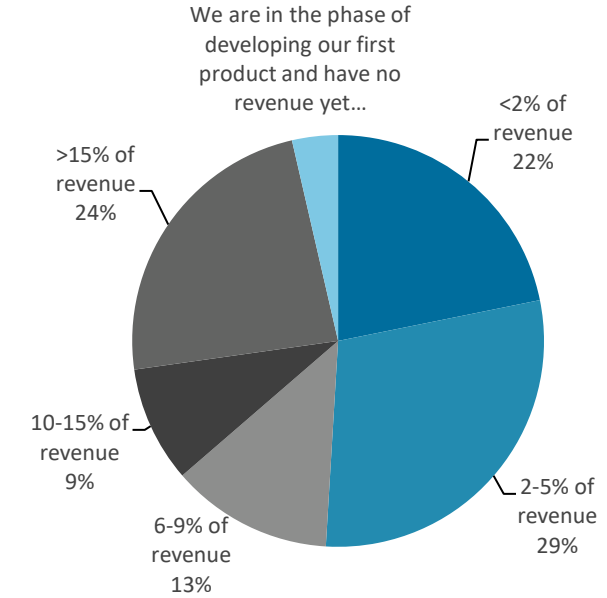
Respondents by company size



Respondents by industry



The size of the annual R&D budget



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Summary of CTO survey results – positive outlook for the year 2021

- The survey respondents comprehensively represent the Finnish industry in terms of industries, size of companies, R&D budgets (57 responses from CTOs)
- No drastic changes seen in the yearly R&D figures: slight increase reported for 2020 – more positive outlook for the future – same trend was visible in all yearly R&D figures
  - For 2020, a slight majority (58%) of CTOs reported that R&D&I budgets have increased or stayed at the same level; However over 42% reported R&D&I budgets to have slightly decreased
  - More positive outlook is expected for the year 2021 when 76% of CTOs expect R&D&I budgets to increase or stay at the same level
- Most of the companies are offering and developing green (84%) and digital (78%) technologies
  - 94% of CTOs are currently investing in R&D&I activities in green and/or digital growth and technologies - 61% of the CTOs are investing in Finland
- Most companies operate in R&D&I ecosystems (75%)
- Influence to European funding through industry associations and decision-making bodies (53%) is growing
- Business Finland (92%) and EU funding (69%) are quite familiar with the CTOs - Only small share participate seeking additional investment funding (24%)
- 43% of the CTOs need to look for the needed competencies and talents outside Finland
  - Competencies needed especially in digitalisation, data and data analytics, AI

R&D budgets during 2020 have diversified between those who increased and those who needed to cut

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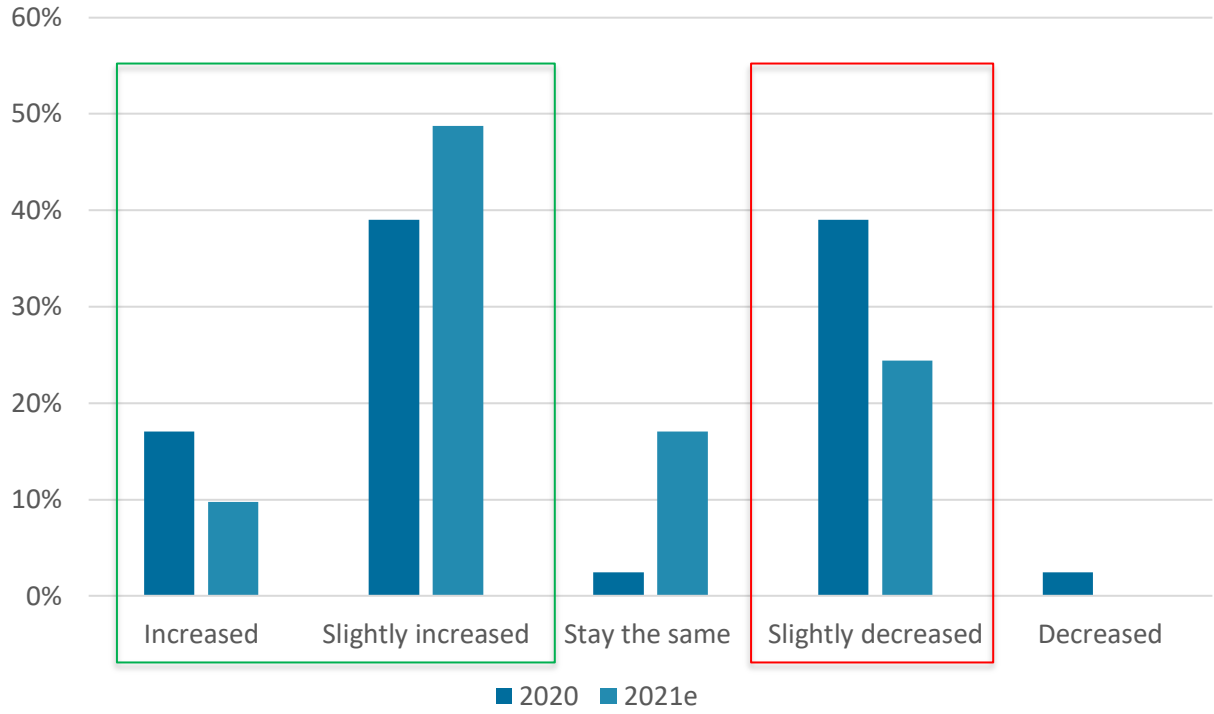


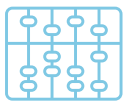
Innovation continues and ecosystem innovation is speeding up, more public funding sought during 2021

- Most of the CTOs report that the **number of new products and services have** increased (69%) or stayed at the same level (17%) in 2020 compared to previous year
  - 75% of CTOs expect this to increase for the year 2021

- The majority of CTOs (58%) reported that the share of **R&D&I done in ecosystems** to have increased during 2020
  - 72% of CTOs expect this to increase for the year 2021

- The majority of CTOs (58%) reported **the number of R&D personnel** to have increased during 2020
  - 67% of CTOs expect this to increase for the year 2021

- 50% of the CTOs see that the **number of patents and use of other IPR instruments** have increased or stayed at the same level (17%) for 2020 compared to previous year
  - Majority (68%) of CTOs expect this also to increase for the year 2021

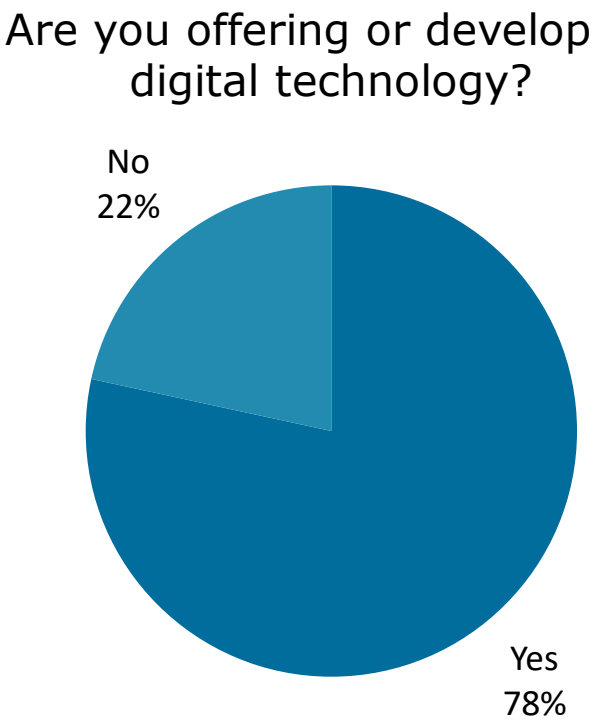


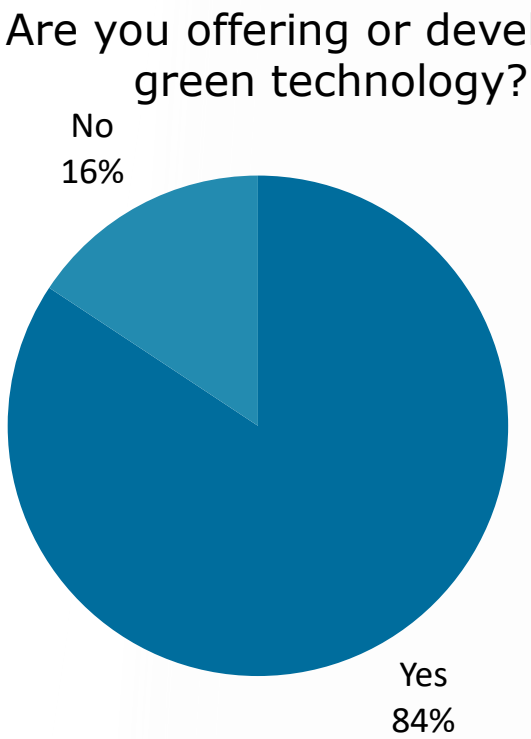
- 50% of the CTOs report that **number of new internal R&D projects** have increased or stayed at the same level (19%) during 2020
  - Majority (52%) of CTOs expect this also to increase for the year 2021

- 47% of CTOs reported that **the number of new publicly funded R&D projects** have increased or stayed at the same level (16%) for 2020 compared to previous year
  - Majority (68%) of CTOs expect this also to increase for the year 2021

What topics in your company's operating environment currently challenge you the most?

Most of the companies are offering and developing green and digital technologies





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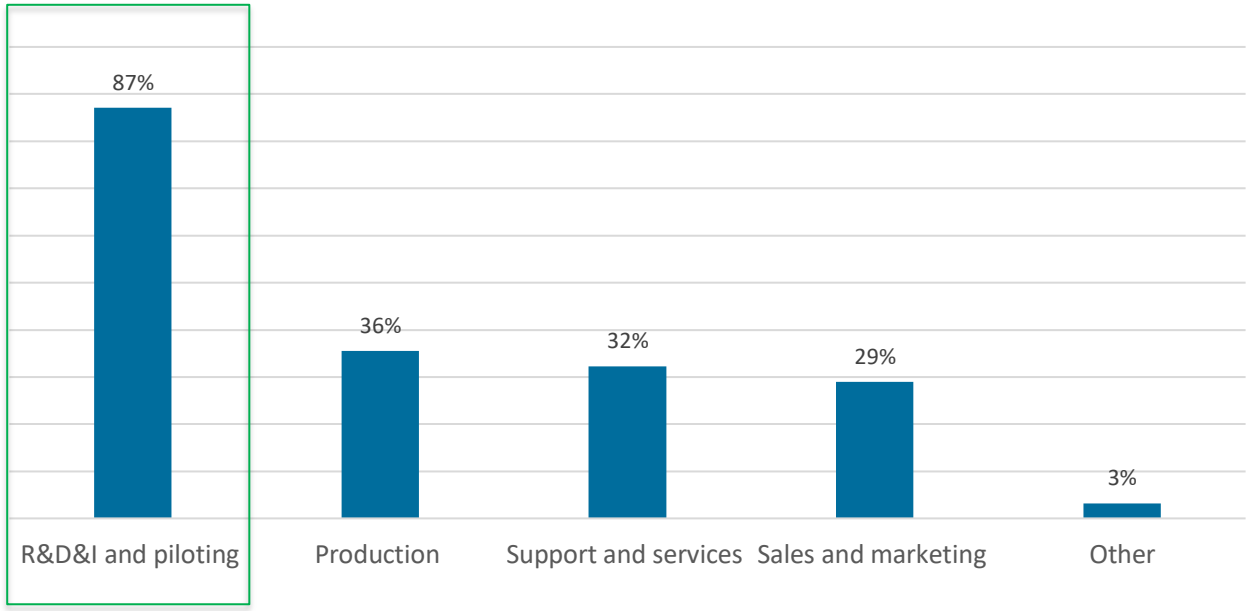
Finland is seen as a good location for R&D&I investments

- 94% of CTOs are currently investing in R&D&I activities in green and/or digital growth and technologies
  - Main investment drivers: strive for competitive advantage and new solutions to customers

- 61% of the CTOs are investing in Finland
  - R&D&I & piloting is the main area to invest in (87%)
  - Why (selected answers):



Public funding

Highly skilled resources

Excellent environment for technology development with skilled engineers

Great cooperation with ecosystem

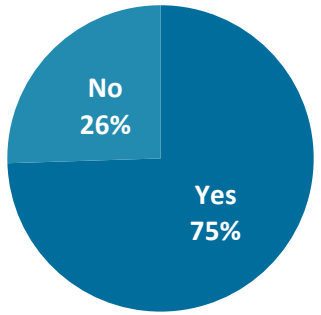
Most companies operate in R&D&I ecosystems – influencing through industry associations and decision-making bodies growing

- 75% participate in ecosystems focusing and/or green and digital technologies to
  - Find new business opportunities
  - Find new R&DI partnerships
  - Get access to new technologies

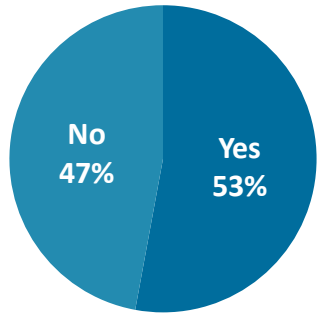
- 53% participate in European industry associations and decision-making bodies

100% of the respondents indicated that COVID-19 has decreased the co-creation with customers

Are companies participating in ecosystems focusing on green and/or digital technologies?



Are companies actively participating in the work of European industry associations and decision-making bodies?



Business Finland and EU funding are quite familiar with the CTOs - Only small participate seeking additional investment funding

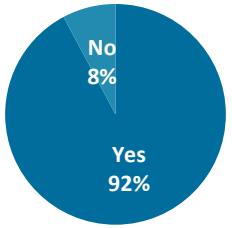
- Applied funding:
  - Business Finland - 92%
  - EU funding instruments - 69%
  - Funding from other markets - 26%
  - Participation in public procurement - 26%
  - Investment funding - 24%

- Why the funding have not been applied (selected answers):

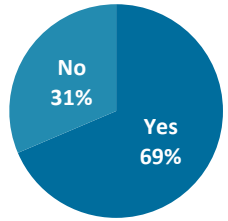
Too complicated and resource demanding

Missing winning consortium and leading partner, missing resources to investigate and take leading role on creating such consortium

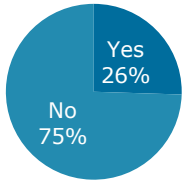
Have you applied for Business Finland funding?



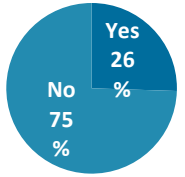
Have you applied for funding from European funding instruments (e.g. Horizon 2020)?



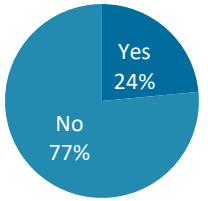
Have you applied or received funding from other markets?



Have you been involved in innovative public procurement?



Have you applied investment funding (e.g. European Investment Bank, World Bank, UN, Regional development banks)?



43% of the CTOs need to look for the needed competencies and talents outside Finland

- What competencies are most needed:
  - Digitalization
  - Data and data analytics
  - AI

- Challenges to attract competencies (selected answers):

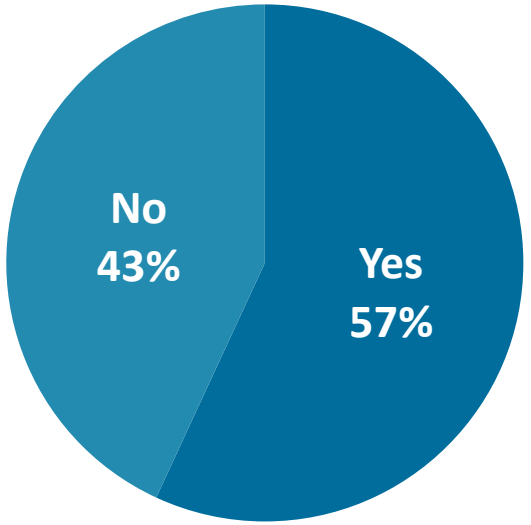
Finding good talents for software development

Small company needs to invest a lot of money to improve in several details to attract and keep the best talent

Employer brand, visibility

Limited amount of resources in Finland. Should be easier to get foreigners onboard.

Do you feel that you can find the needed talents in Finland?



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Workgroup discussion summary

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Workgroup discussion summary

1. Increasing investments - How to drive investments and R&D in Finland?

- R&D&I investments to Finland are driven by
  - Existing competence in engineering and elsewhere
  - Currently improving cost competitiveness against competitive economies
  - Availability of green energy, safe society
- Main challenges for R&D&I investments are
  - We are lacking experienced platform economy/technology experts
  - Lateness in start of the required training activities
- Finland could become even more attractive for new investments if the supportive environment would be on the same level as in competing countries
  - Motivation and training of platform economy & related technologies is required
  - Training should be more focused and based on joint agenda
  - Practical training to be increased in area of engineers & PhDs (could this be enabled with funding of Suomen Akatemia?)
  - Investments into ecosystems (instead of projects alone) & pilot/demonstration facilities would be supported more than today

Workgroup discussion summary

2. Driving growth – How to succeed in internationalisation and enhancing exports?

- What are the current main challenges to grow business outside Finland for companies that are not yet global?
  - Differentiation, trust, reputation & brand
  - Sales and marketing play important role, and need to cooperate intensively
  - Local competences, channels and integrators play an important role
- What could be changed to make internationalisation and/or exports easier for Finnish companies?
  - Technology should play bigger role in companies
  - Engine companies - small companies benefit from ecosystem collaboration
  - Business Finland’s support is important
  - Platform economy related opportunities

Workgroup discussion summary

3. Building cooperation – How to build and operate R&D&I ecosystems?

- Trust between partners in developing new ecosystems or projects
- Good examples of how trust has been overcome i.e. One Sea, Clever Health...
- Ecosystem coordinator a key in building trust for others to follow
- Some ecosystems affected more than others by COVID
- Business should lead the ecosystem, and Research provide expert development
- Different actors from Corporates, SMEs, Startups, Research, Cities, Universities needed
- Developing new value chains as well as projects
- Identify multiple competencies that could be outsourced across the ecosystem

Workgroup discussion summary

4. Boosting business – How to utilise innovation and investment funding?

- Ecosystems should not be put together just for the funding call, but rather serve the long-term innovation strategy
- Public funding is a good instrument to de-risk the innovation development
- Public funding brings additional value in terms of ecosystem and partnerships

Workgroup discussion summary

5. Building competences – How to attract new and needed talents?

- What competencies are needed?
  - AI, MR, algorithms dev.,optical photonics (diffractive optics especially), embedded software programming, fibre/material, circular economy, etc.
  - BUT don’t forget the basic competencies, as they are also critical for building the economy and are at risk to fall short
- How do we get them?
  - Establish international competence centers, partner with international academia/RTO
  - Try to keep foreign students (easier to keep than to bring)
  - Red tape must be faster, e.g. for work permits

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Main result highlights and recommendations

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Main result highlights (1/2)

- Increasing green and digital R&D&I investments
  - Positive outlook for the year 2021 – R&D&I investments are expected to increase or stay at the same level for 2021 and **Finland is seen to be an attractive location for R&D&I investments**
  - Green and Digital growth - Finnish companies are active in the 'Green and Digital' arena and **almost all companies are investing in the R&D&I activities in this area**
- Driving internationalisation and growth
  - **China challenges the European companies even more year by year as a growing power in R&D&I**
  - Sustainability and circular economy - **High regulatory targets and customer demand** challenges the companies in their operation
  - Challenges identified: More focus and support is needed in finding right local competences, channels and integrators especially abroad

Main result highlights (2/2)

- Building cooperation and R&D&I ecosystems
  - **Most companies operate in R&D&I ecosystems** – influencing through industry associations and decision-making bodies is growing
  - Stronger business and innovation ecosystems needed - Small companies benefit from **ecosystems led by large enterprises**
- Boosting innovation and investment funding
  - Business Finland and EU funding are familiar instruments for CTOs when applying innovation and investment funding
  - **Public funding is seen essential to de-risk the innovation development and support building new trusted partnerships**
- Building competences
  - All competences can’t be found in Finland -**talents needed especially in digitalization: data analytics, AI and platform economy**
  - **Immigration should be faster** and support needed to keep the foreign experts and students in Finland

Recommendations (1/2)

Recommendations for Industry

- **Be brave and innovate** – crisis is the time when markets are divided in new ways
- Continue great development **building and joining new ecosystems** – it is the most efficient way to innovate
- Ensure smooth transition from innovation ecosystem into business ecosystem through **co-creating with your international customers and partners**
- **Seek public innovation funding** in Finland and Europe – Recovery Package and other governmental subsidies create biggest ever opportunity to balance your risk and grow internationally

Recommendations (2/3)

Recommendations for Universities, RTOs and Academy of Finland

- **Increase co-operation with industry** – it gives access to most relevant research problems with fastest impact to society
- Strengthen measures to recognize and **reward successful industry co-operation**. Use these extensively in nominations, promotions and funding criteria:
  1. Funding volume for projects done in collaboration with the industry
  2. Patents licenced by industry
  3. Business and jobs created in established companies
  4. Spinoffs created

Recommendations (3/3)

Recommendations for Public-Private Partnerships

- **Launch a programme on platform economy** to support competence building, cooperation and future investment in the field
- **Continue support for industry-led ecosystems** (i.e. Veturi funding) to ensure creation of strong export driven ecosystems
- Extend Business Finland **funding instruments to cover also investments until the first industrial deployments**. Needed for both Green and Digital transformation
- Ensure adequate support to **drive European sovereignty** in the areas of
  1. Technology sovereignty: quantum computing, artificial intelligence, blockchain, and chip technologies
  2. Data sovereignty: citizen's control of own data and easy-to-switch cloud platforms (like Gaia-X)
  3. Defence and dual-use technologies
  4. Batteries and battery materials
  5. Energy in general