

CTO Survey: results Finland solving global challenges

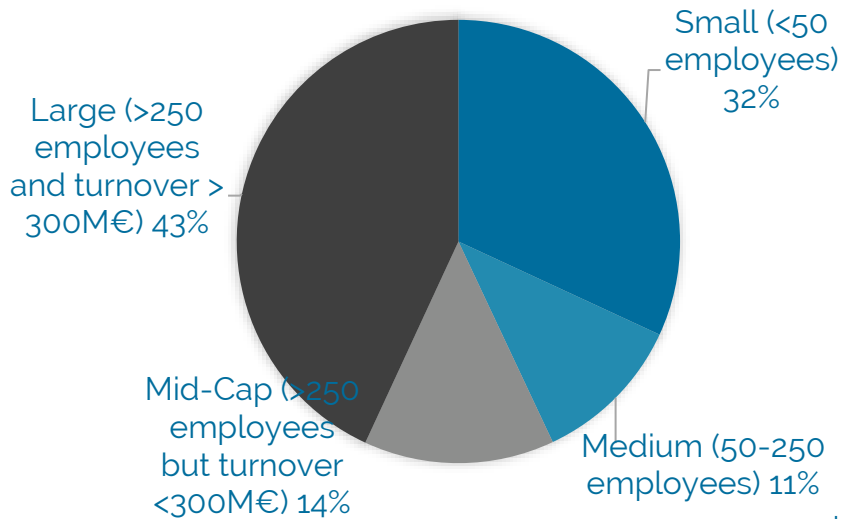
CTO Forum - Autumn 2021
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Spinverse

Content

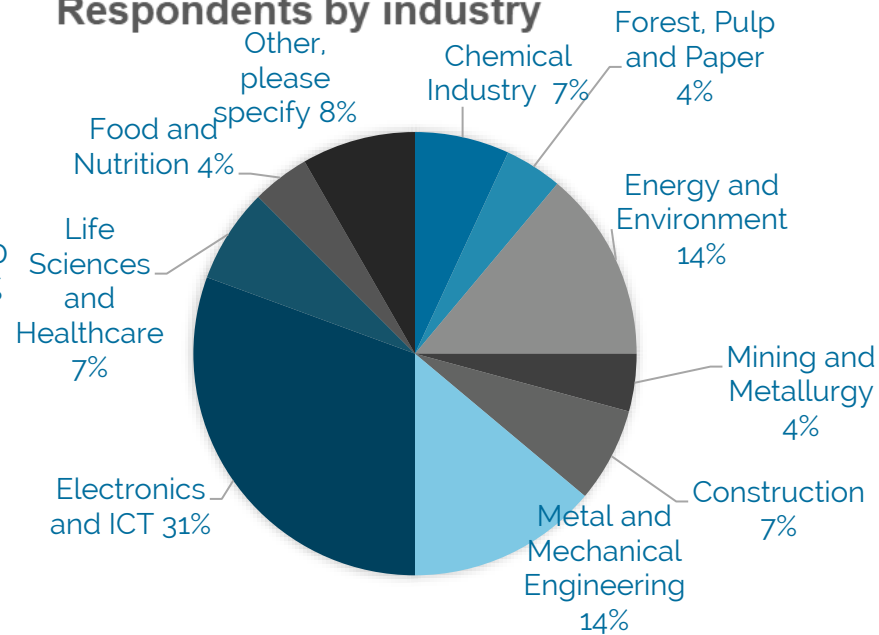
1. Survey respondents and findings from yearly R&D figures
2. Carbon neutrality and digitalisation: Main survey results
 - Greatest challenges
 - Investments and business environment
 - R&D focus
 - Competences and partnerships

The survey respondents comprehensively represent the Finnish industry

Respondents by company size

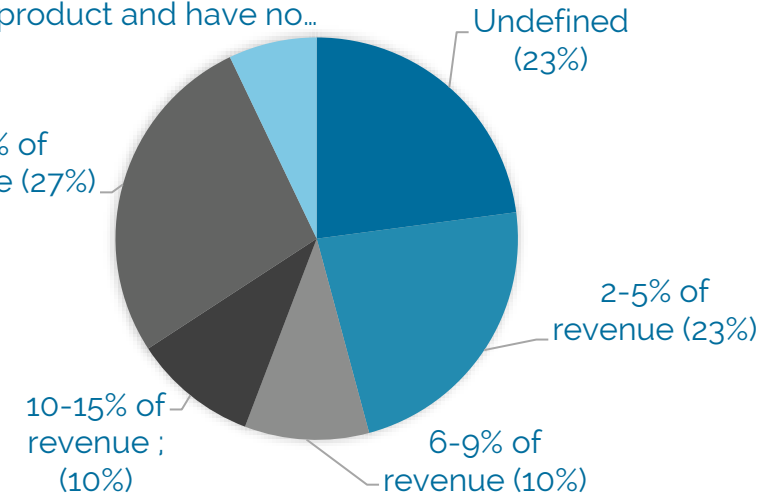


Respondents by industry



The size of the annual R&D budget

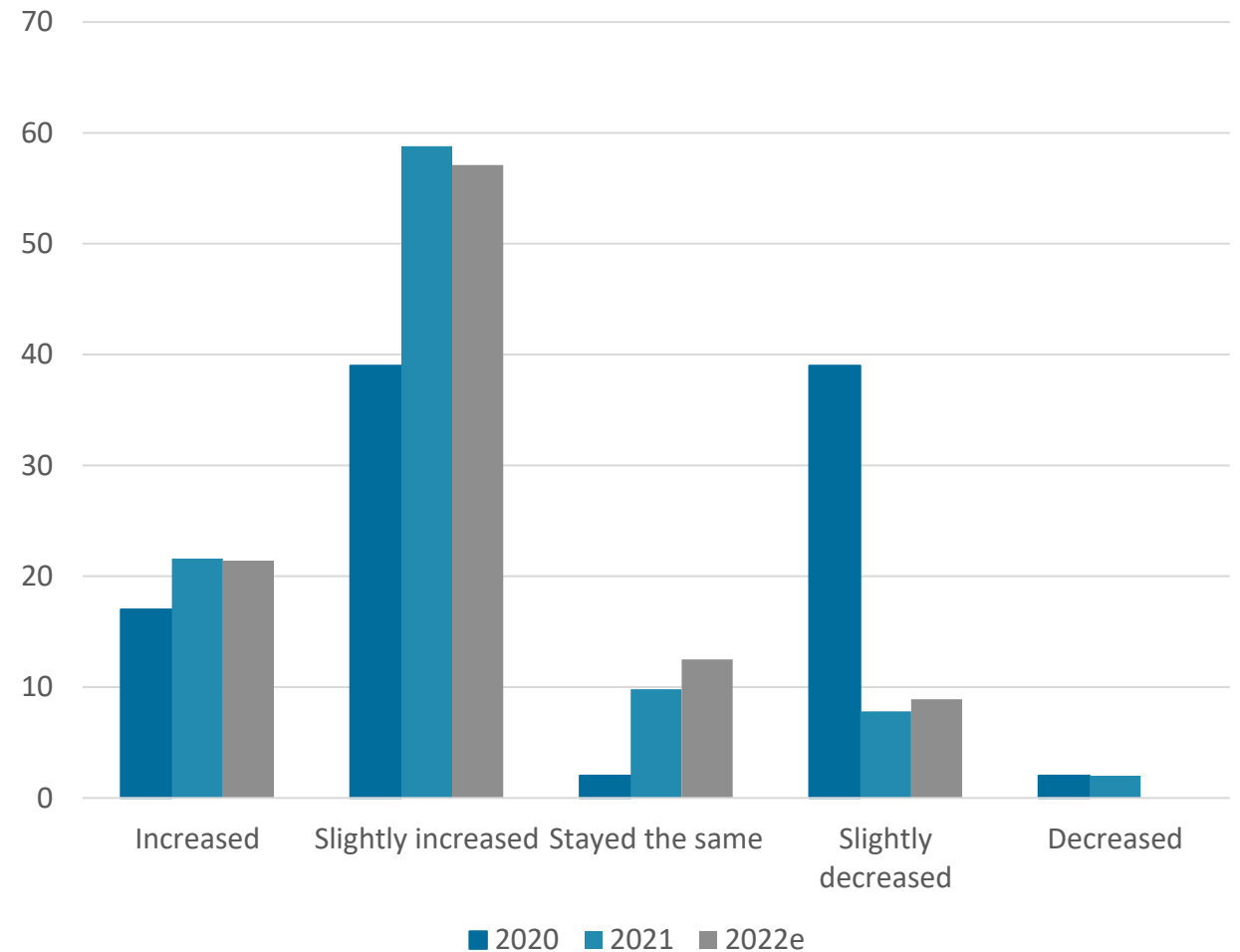
We are in the phase of developing our first product and have no...



72 responses from CTOs

CTOs report more positive outlook for their companies' R&D budgets compared to 2020

- For 2021, a majority (80%) of CTOs reported that R&D&I budgets have increased
- Positive outlook extends for the year 2022 when 76% of CTOs expect R&D&I budgets to increase



Bright estimates for R&D indicators: clear increase in R&D projects and personnel



- The majority of CTOs (74%) reported **the number of R&D personnel** to have increased during 2021
 - 76% of CTOs expect this to increase for the year 2022



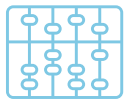
- 69% of the CTOs report that **number of new internal R&D projects** have increased and 16% that they have stayed at the same level in 2021 compared to previous year
 - Majority (63%) of CTOs expect this also to increase for the year 2022



- 57% of CTOs reported that **the number of new publicly funded R&D projects** have increased
 - Majority (61%) of CTOs expect this also to increase for the year 2022



- Most of the CTOs report that the **number of new products and services have** increased (72%) in 2021
 - 85% CTOs expect this to increase for the year 2022



- The majority of CTOs (62%) reported that the share of **R&D&I done in ecosystems** to have increased and 23% that they have stayed at the same level during 2021
 - 71% of CTOs expect this to increase for the year 2022



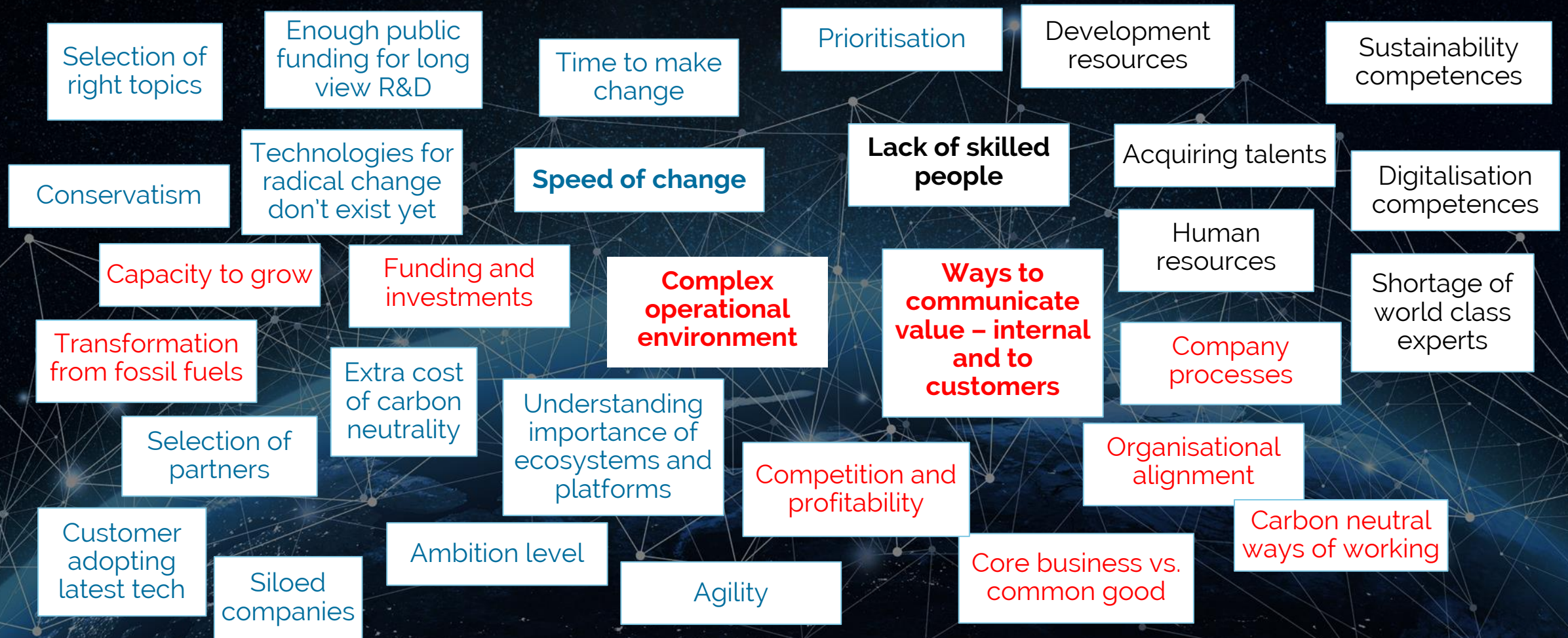
- 47% of the CTOs see that the **number of patents and use of other IPR instruments** have increased
 - Majority (67%) of CTOs expect this also to increase for the year 2022

R&D and operating environment

– current issues and challenges based on the survey



Greatest challenges achieving green and digital transition



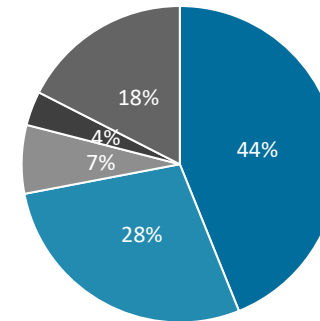
Investments in carbon neutrality

- Investments in carbon neutrality are expected to increase from 2025 towards 2030
- Most CTOs believe that the major change towards carbon neutrality will happen in next 6 years
- The changing business environment will drive especially demand for new solutions and changes in value chains
- Comments regarding global position in carbon neutrality (selected answers):

We are forerunner in circular economy, taking steps towards carbon neutral path.

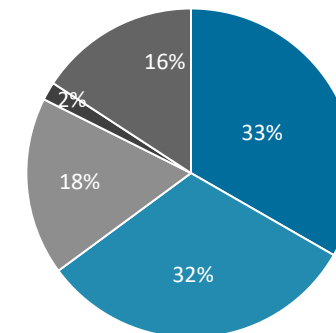
Everybody is in a "same boat" in this important matter. No sense to create competition - rather co-operation.

How do you foresee your company's R&D investments for carbon neutrality by 2025?



- <2% of revenue
- 2-5% of revenue
- 6-9% of revenue
- 10-15% of revenue
- > 15% of revenue

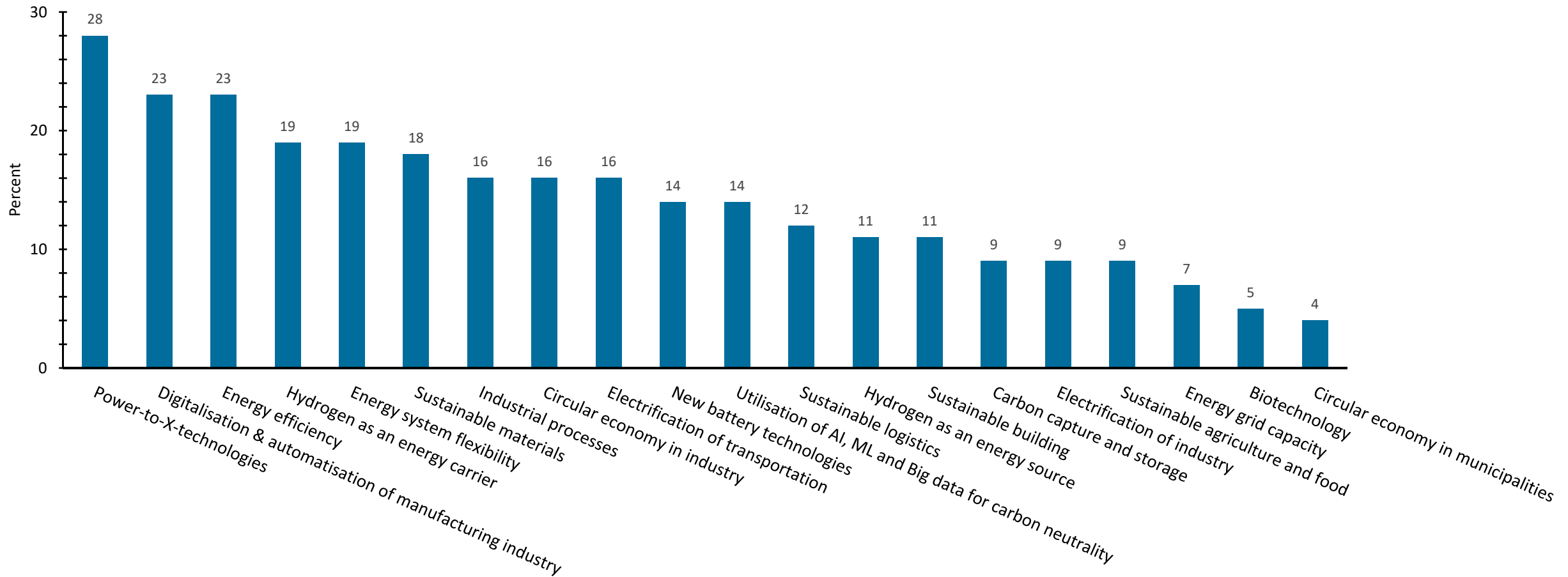
How do you foresee your company's R&D investments for carbon neutrality by 2030?



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R&D focus areas in carbon neutrality

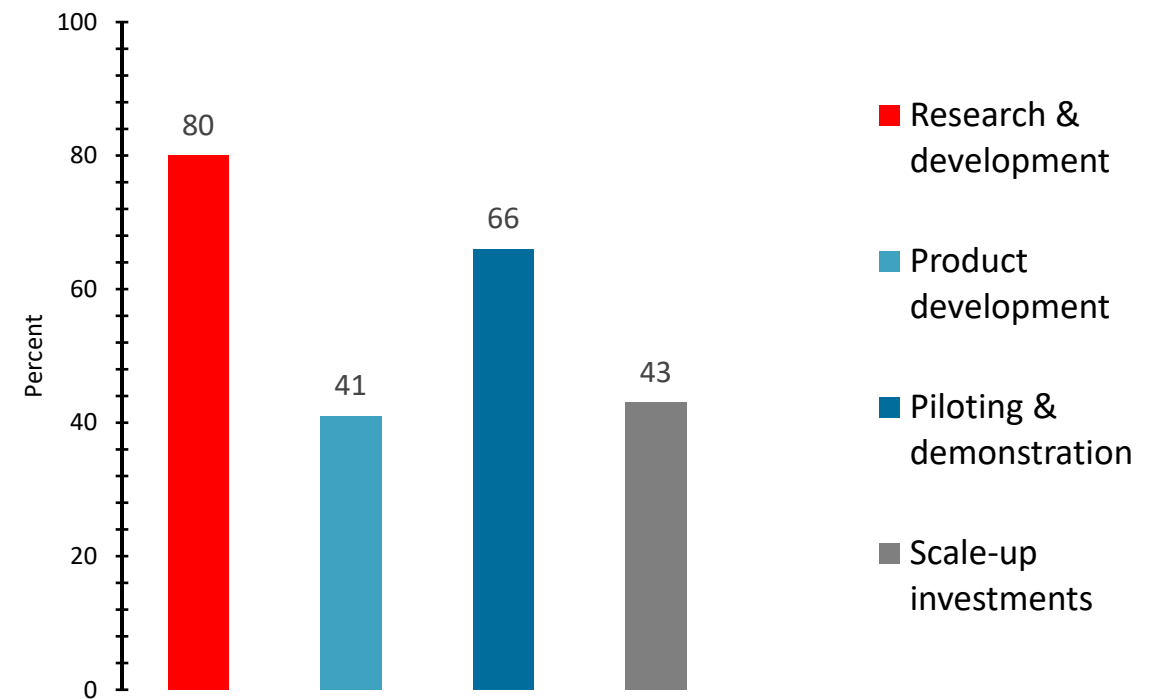
Areas where CTOs feel the RDI efforts should be focused on during the next decade to achieve carbon neutrality



Basic research and piloting & demonstration are key activities for public support in carbon neutrality

- 91% of CTOs believe that they are ahead or at the same level with the global competition in company's carbon handprint
- 77% of CTOs plan to seek public support for R&D and technology development in carbon neutrality
- CTOs view EU and Business Finland as main public funding sources for R&D in carbon neutrality

- Funding is needed for:



What it takes to achieve the carbon neutrality goals?

- 58% of CTOs rate their company's competences in carbon neutrality highly
- Competences required (selected answers):

Competences on assessing carbon footprint

Circular economy, sustainability, emissions expert

Regulatory and new business area specific competences

AI, other technical skills, ecosystem building competence

Follow up standardization and market trends

- 73% of CTOs consider their company requiring new partners in regards of their carbon neutrality goals
- Partners needed (selected answers):

Effective methods for estimating carbon handprint

Expertise in key drivers of manufacturing and business

Setting up clear metrics and goal for carbon neutrality

Willingness to test new ways of working and to adapting new technologies

Investments in digitalization

- Investments in digitalization are expected to stay mostly at the same level from 2025 towards 2030
- 65% of CTOs believe that the major change towards digitalization has happened or will happen in next 3 years in their companies' business environments
- The changing business environment will drive especially demand for new solutions and new business and revenue models
- Comments regarding global position in digitalization:

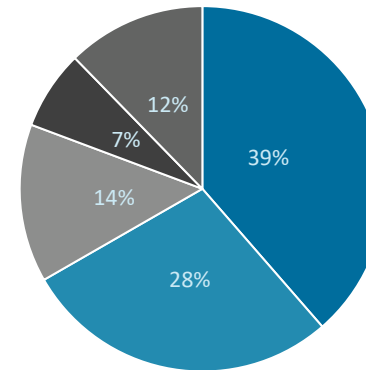
Market leader is ahead

We have invested for R&D of digitalization already for a long time

Many of our traditional peers do not seem to be too active in digitalisation. This does not mean that we can rest on our laurels!

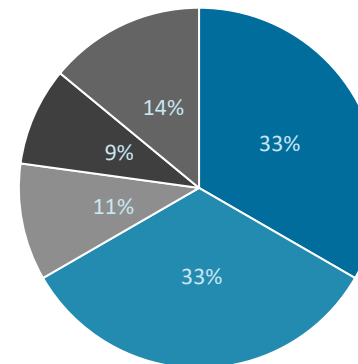
All companies in the field are generally very highly digital and key differences are with maturity slightly varying along with company size

How do you foresee your company's R&D investments for digitalisation by 2025?



- <2% of revenue
- 2-5% of revenue
- 6-9% of revenue
- 10-15% of revenue
- > 15% of revenue

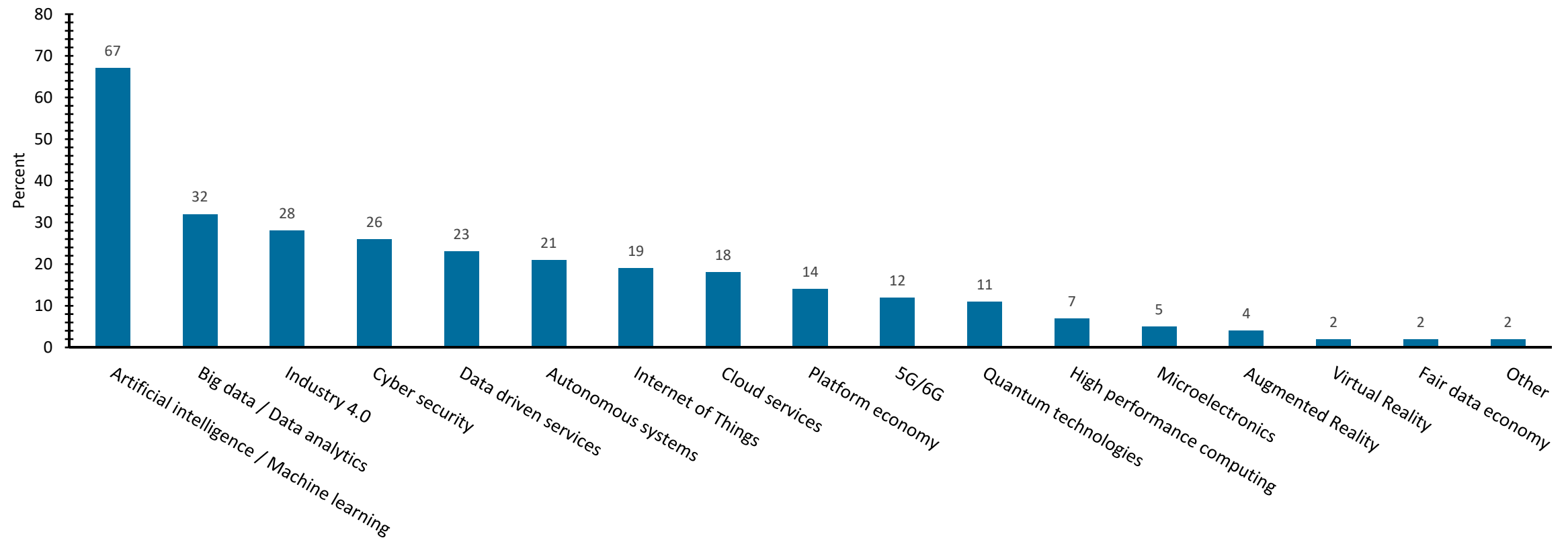
How do you foresee your company's R&D investments for digitalisation by 2030?



- <2% of revenue
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R&D focus areas in digitalisation

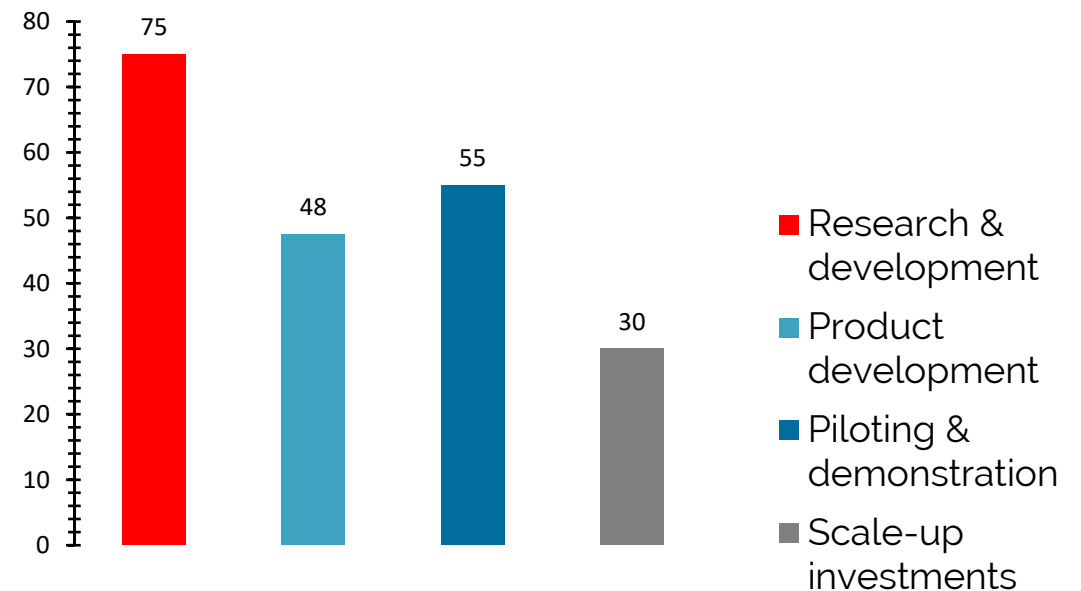
For which areas should we focus our R&D efforts during the next decade to drive digitalisation forward?



High confidence in global competitiveness in regards of digitalisation

- 86% of CTOs believe that they are ahead or at the same level with the global competition in company's digitalization
- 70% of CTOs plan to seek public support for R&D and technology development in digitalisation
- CTOs view Business Finland and EU as the main public funding sources for digitalisation

Funding is needed for:



What it takes to achieve the digitalisation goals?

- AI/ML know-how and data analytics are required competences both for new recruits and for partners

- 47% of CTOs rate their company's digital competences high
- Further competences are needed in (selected answers):
- 70% of CTOs regard their company requiring new partners in regards of digitalisation
- Partners needed for (selected answers):

More **SW experts** - Finland has a severe shortage of people capable of developing electronics and software, especially, embedded, real-time SW solutions

More digital native employees to incorporate digital solution into current and new business models

More experts for **ML/AI**, design automation, data analytics, knowledge graph and cloud-based data services

SW & HW development and testing partners

Data analytics

Cloud SW competences

Digitalization skills for supply chain