

CTO Survey: results and workgroup conclusions

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CTO Survey 2022

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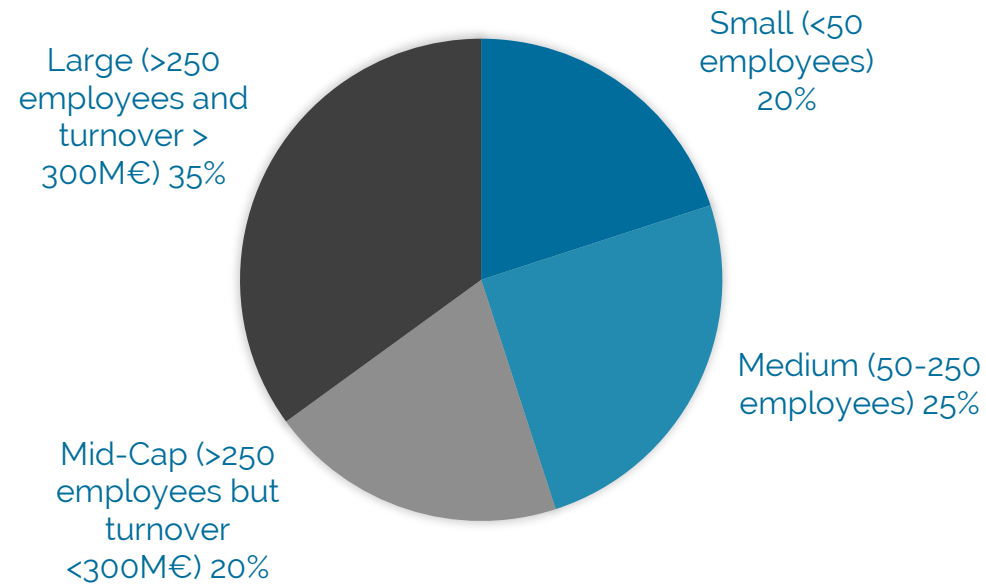
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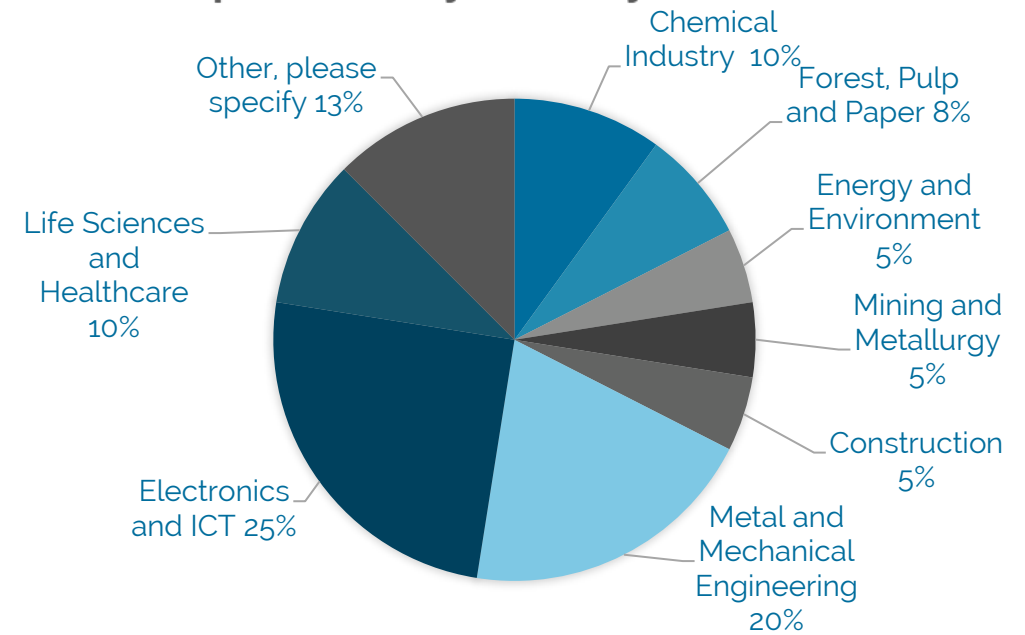
CTO Survey 2022 results

40 CTO responses bring qualitative data about Finnish industry

Respondents by company size

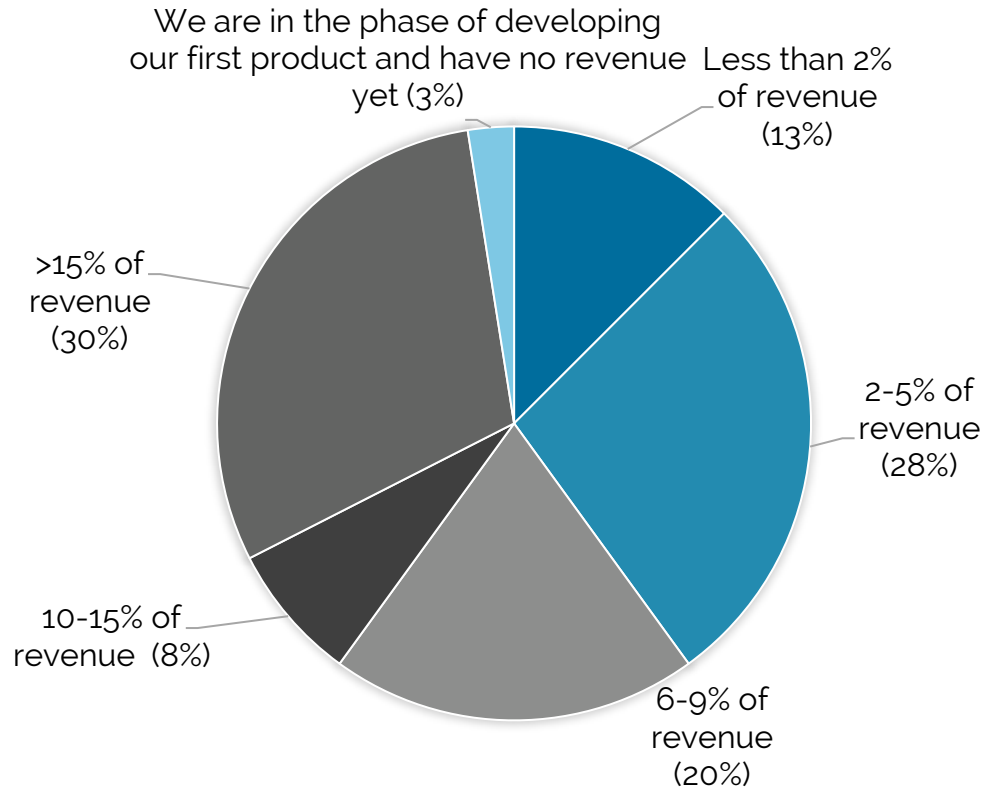


Respondents by industry

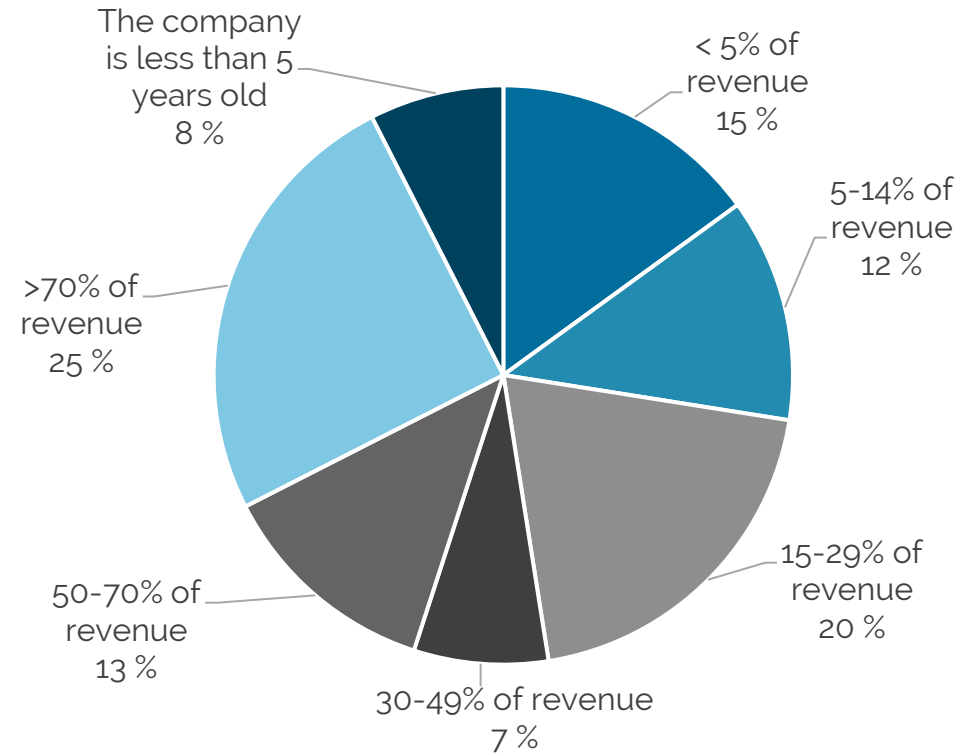


New business based on new products

The size of the annual R&D budget

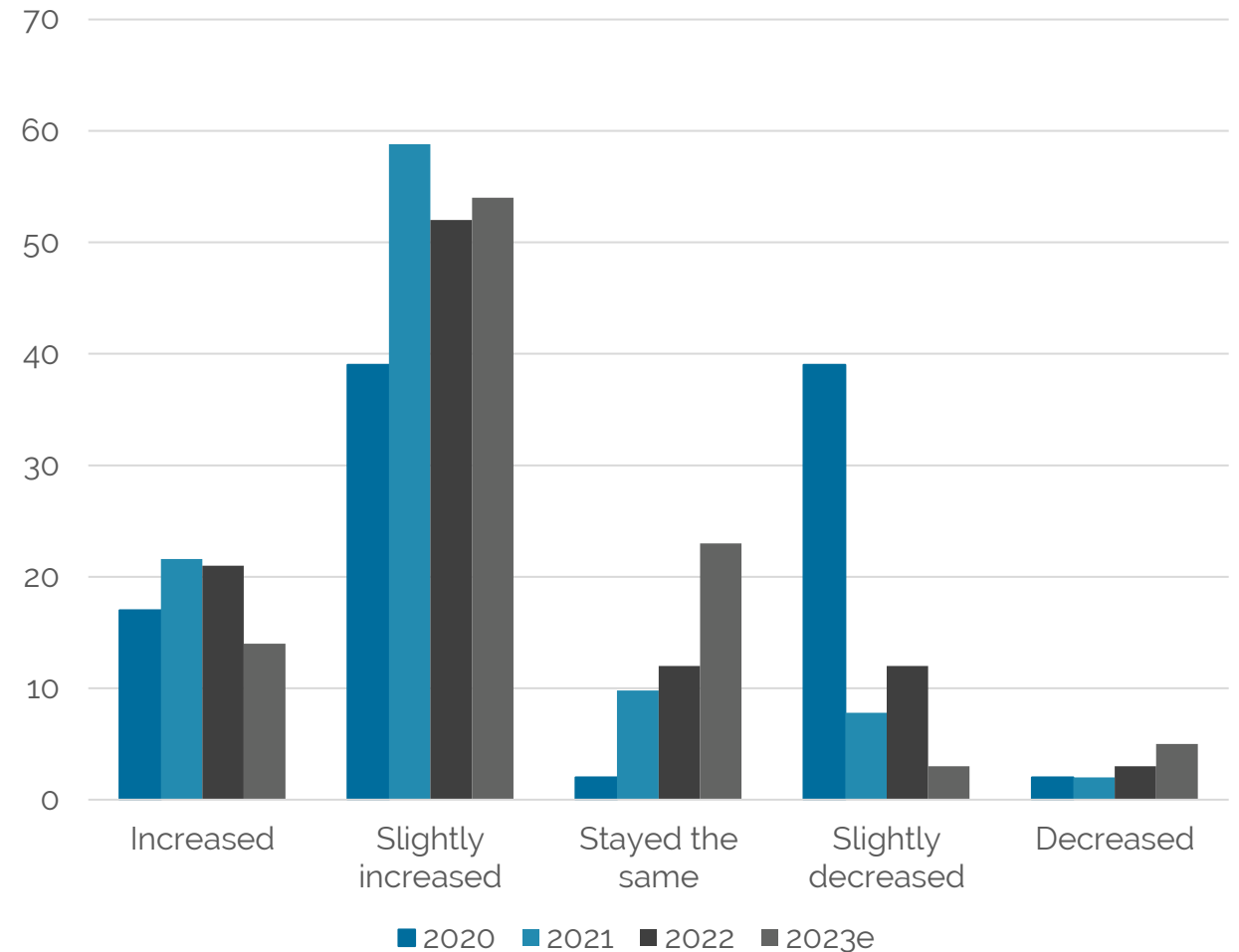


Share of revenue from new products launched within past five years

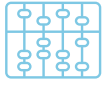


Post-pandemic growth continues – CTOs still optimistic for 2023 investments

- For 2022, a majority (73%) of CTOs reported that R&D&I budgets have increased
- Positive outlook extends for the year 2023 when 68% of CTOs expect R&D&I budgets to increase
 - 23% expect the budget to remain at the same level compared to 2022



R&D indicators: R&D in ecosystems drives the growth



The majority of CTOs (70%) reported that the share of **R&D&I done in ecosystems** to have increased

- 72% of CTOs expect this to increase for the year 2023



The majority of CTOs (70%) reported **the number of R&D personnel** to have increased during 2022

- 74% of CTOs expect this to increase for the year 2023



65% of the CTOs report that **number of new internal R&D projects** have increased

- Majority (65%) of CTOs expect this also to increase for the year 2023 and 23% expect them to remain at the same level.



51% of CTOs reported that **the number of new publicly funded R&D projects** have increased and 19% that they have stayed at the same level compared to 2021.

- Majority (54%) of CTOs expect this also to increase for the year 2023 whilst 38% expect them to remain at the same level



Most of the CTOs report that the **number of new products and services have** increased (76%) in 2022

- 74% CTOs expect this to increase for the year 2023

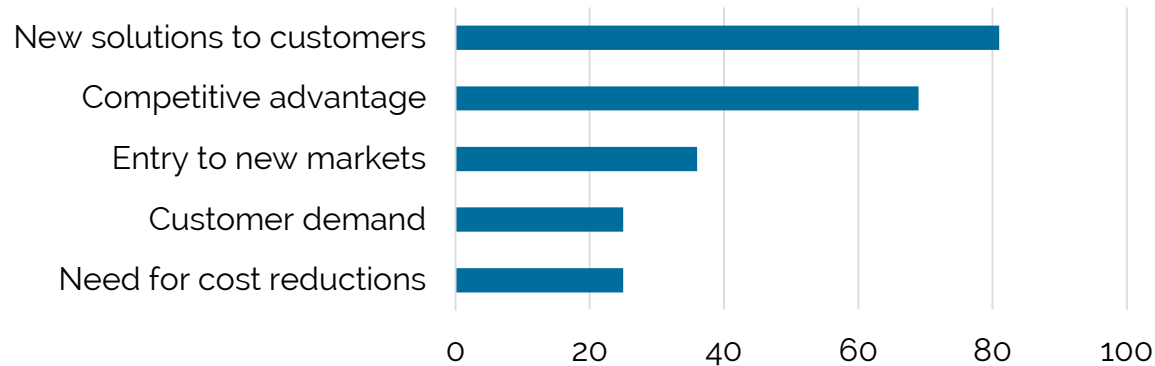


60% of the CTOs see that the **number of patents and use of other IPR instruments** have increased and 24% that they have stayed at the same level compared to the previous year

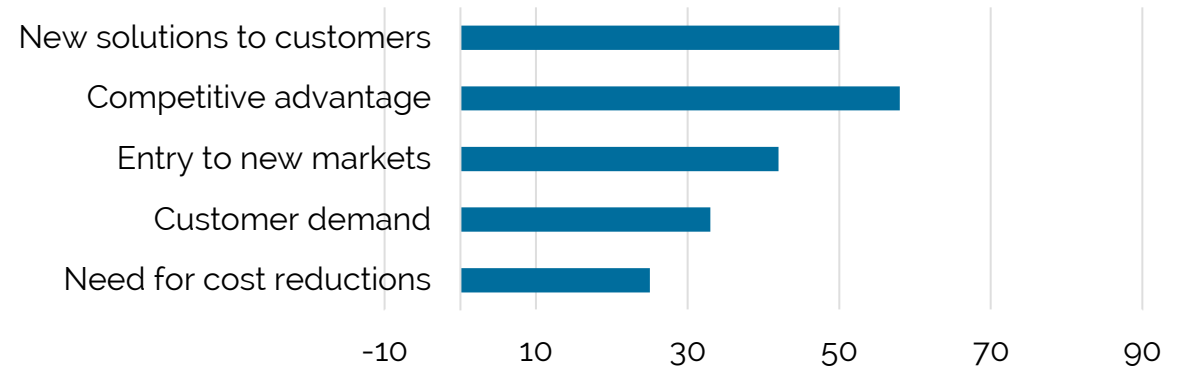
- Majority (67%) of CTOs expect this also to increase for the year 2023

Investments in R&D&I

95% planning to invest in R&D&I activities in Finland



63% planning to invest in R&D&I in other countries



Reasons not to invest in other countries:

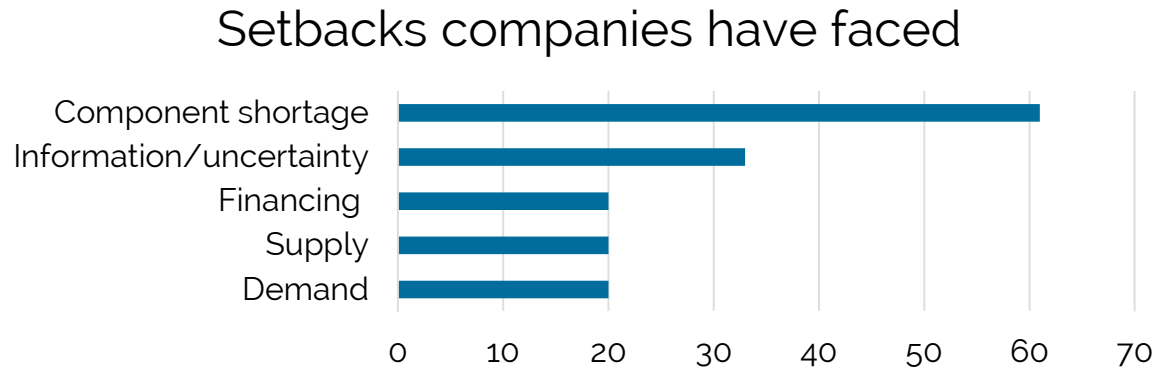
Synergy of having R&D in one place

Other markets not yet in focus

Existing operations and cost base location

Green and digital transition remain important for the companies – component shortage still a key roadblock

89% deem green and digital transition important and 61% have not seen any setbacks to their transition efforts



Other:

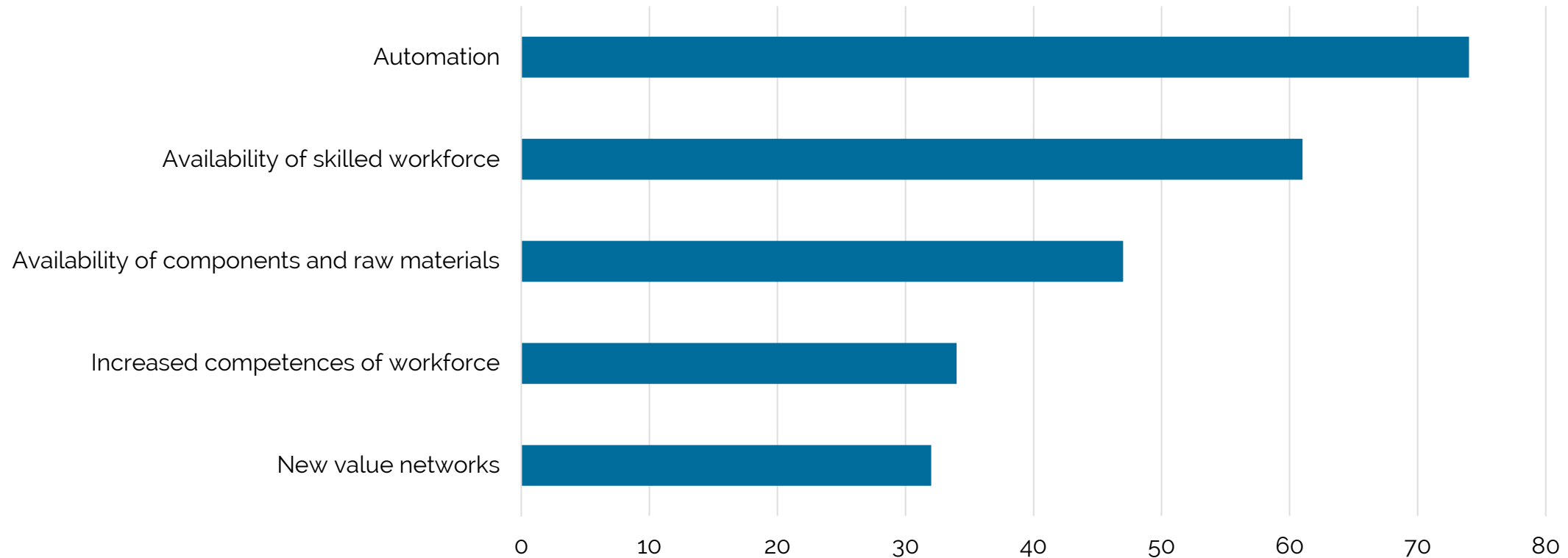
- Difficulty to take long-term actions
- Customer decision-making
- Regulations
- Cost cutting

50% of CTOs note that the energy crisis has had moderate to high effect on their company's operating environment.

Key effects:

- Added cost (maintenance, operating, cost reduction, energy cost)
- Negative effects of potential electricity cuts
- Uncertainty (customers, business environment)

Automation and skilled workforce key in increasing companies' productivity



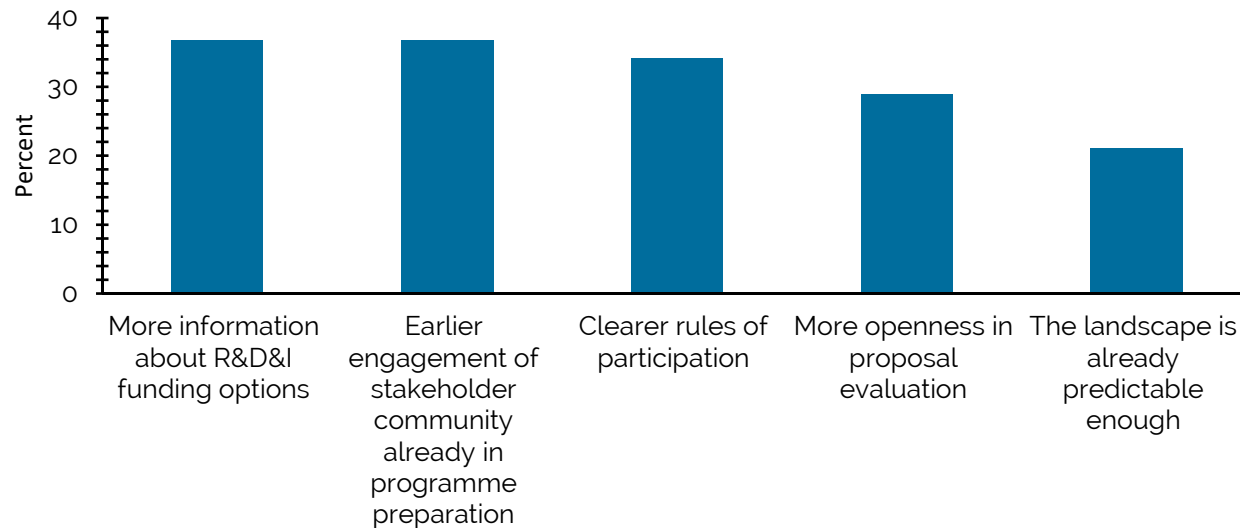
35% of CTOs require more predictability for the national R&D&I funding landscape

CTOs report active participation in publicly funded projects (82%) with 66% of CTOs rate that their company's know-how of public funding programmes between moderate and high.

Complementarity of EU and national funding

- Clear national focus
- Alignment between national innovation policy and EU agendas to create synergies

How to make national funding landscape more predictable?



Continuum and stability in innovation policy and public funding instruments

Longer term programmes

CTOs expect public education to focus on industry specific technologies, ICT & project management

Vocational and higher education needs for the next decade:

AI/ML skills

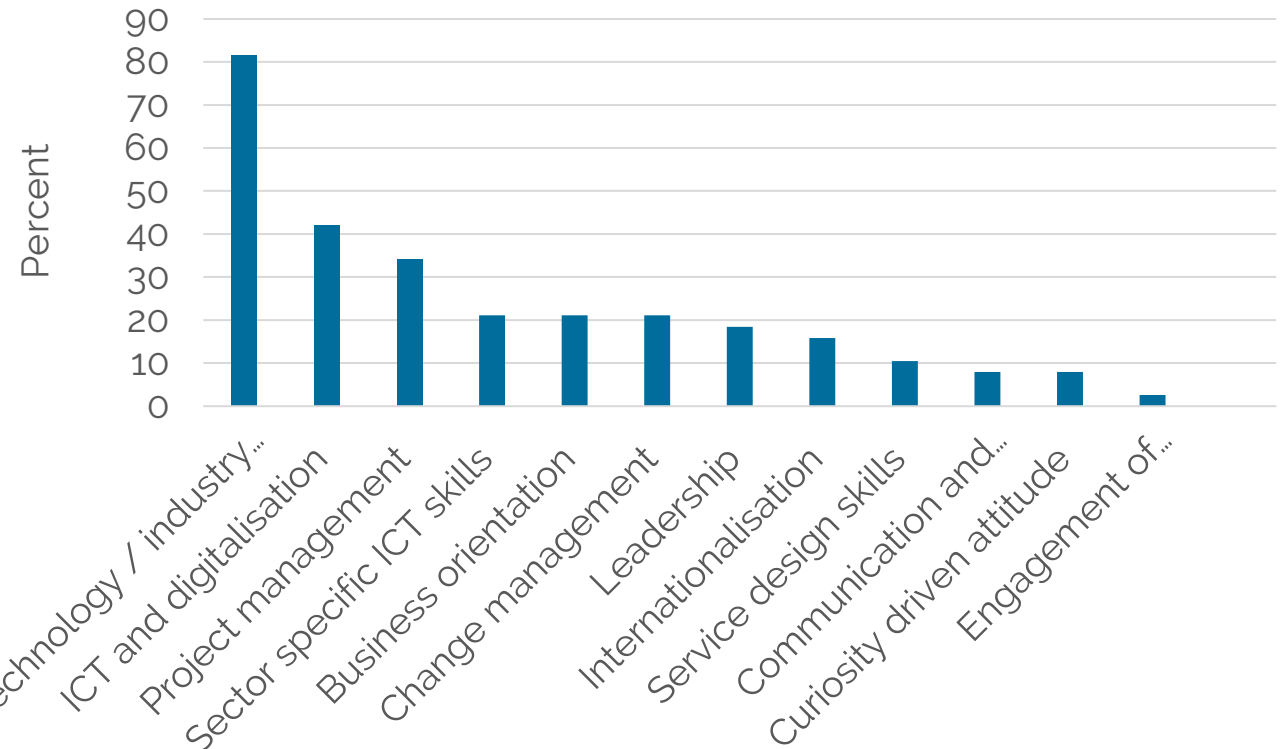
Industry specific engineering knowledge

Hardware, semiconductors

Chemistry, quantum, physics, process & material sciences, biosciences, automation

Data analytics

Vocational education needs more focus



R&D and operating environment

– current issues and challenges based on the survey



CTO Forum autumn 2022 workgroup conclusions

Workgroup discussion summary

1. Long-term R&D plan – directions of public funding for companies

- Level of long-term funding should be guaranteed, but also real focus areas defined
- Long-term development needs visions and roadmaps, but also commitment from funding
 - Roadmap thinking natural to companies, should be also by public funding
- Ecosystems are good drivers if clear roadmap and wide enough scope
 - Veturi concept good (but depends on the Veturi company)
- Commercialization should be part of the R&D&I project
 - Customer validation, business models, business development, market entry
- Funding for different TRL levels and types of companies (SMEs especially) needed
- R&D&I tax deduction scheme needed
- IPR loans needed for start-ups

Workgroup discussion summary

2. R&D investments – drivers for investments in Finland and abroad

What is the key pull factor of Finland for R&D investments?

- In Finland, high technical overall competence and education and easy to find technical competence. Great technical innovation competence. Easy to start companies in Finland. Most investments come through start-up sales. Start-up as a seed, bigger companies build R&D around the seed.

How do we stay attractive in global competition?

- Keep the higher education in high level, educate enough AI and ICT workforce
- A strategy and focus needed for technology specialization. In national level → Good marketing abroad.
- ICT industry must be recognized, the national policies and strategies need to be updated, more cross pollution between industries.
- Long term strategies and investments: E.g. BF Finland programs should have a longer life span.
- RDI positive attitude in the society,
- Innovation idols to attract workforce

Workgroup discussion summary

3. Ecosystem effect – continuous competence development in collaborative environments

What are the key bottlenecks in competence development/challenges and how can we solve them?

- Old ways of working keep focus on the old core and investments
 - No investments to new
 - Need someone (champion/sponsor) to drive ecosystem way working and competence.
- If you don't join the ecosystem for the right reasons and agree on common goal
 - E.g. Veturi-model may lead to one sided linear business model.
 - Is a neutral actor needed to keep the ecosystem equal (network model)?
 - Business motivation and goals need to be openly shared
- Knowledge sharing is limited
 - Clarity on the ecosystem structures, rules and operational model.
 - IPR or regulatory issues need to be solved
 - Two-way mindset in helping and collaboration
- Clear objective setting often missing
 - Clarify between the ecosystem partners and inside the companies
 - Make learning of the measured objective (KPIs)

Workgroup discussion summary

4. Attracting talent – ways to increase the talent pool creating innovations

- Change your overall perspective, take advantage of what we have learned: Build more on remote-workforce + build infrastructure to attract moving to Finland
 - Easy to start work, can gradually shift to Finland, need infrastructure for whole package (family)
 - Remote-Finland' hubs
 - Build more on interim/freelancer
- Proactive use cases by industry to academia, maybe through (digital) collaboration platforms
- Promote seamless exchange between academia and corporate
 - Enable easier return to academia from corporate world
 - Private education sector to complement and speed up public education sector

Workgroup discussion summary

5. Increasing productivity – key pathways to productivity growth

As traditional productivity measures [GDP/work cost] current operations, we need to focus on driving new business by:

- R&D efforts need to be shifted to also drive faster commercialization and scaling of new solutions primarily to export business
 - Development of new solutions with customers
 - Adopting faster ways to understand and validate customer value
 - Creating new platforms for scaling industrial level innovations
 - Primary measure: new revenue and export value
- Leadership must better ensure that more time is dedicated to value-adding jobs/tasks
 - Productivity should come from new high value-adding business instead of efficiency
- Public sector must operate more efficiently and together with the private sector to free resources to value-driving business development
- Public funding must be directed to help companies be more courageous and invest their resourcing in new business innovation
 - Solving customer problems should be made the driver, as it also helps in creating the motivation and business case for new ventures