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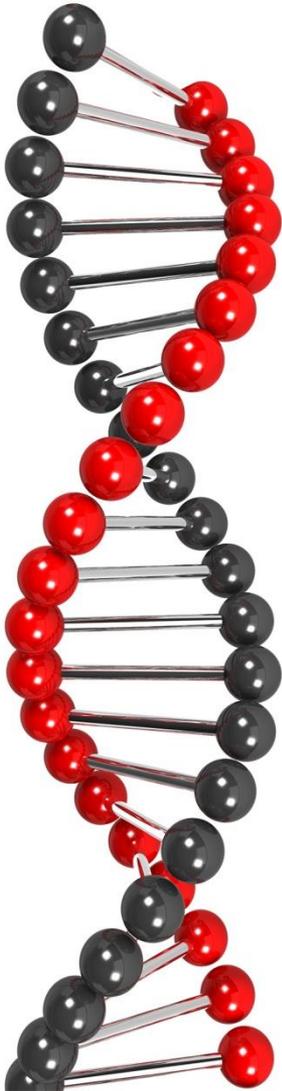
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## **CTO Survey 2014**

*The View of Finnish CTOs on the Latest R&D Trends*  
*Dr. Laura Kauhanen, Spinverse Oy*

Lauri Tolvas, Laura Kauhanen, Jussi Kajala

# Executive Summary



- Nearly 100 Finnish CTOs were reached either by online questionnaire or in-depth interview
- Almost half of the top 100 R&D investors in Finland answered the Survey, making the results "the voice of the top 100 R&D investors in Finland"
- Key findings of the survey are:
  1. **R&D investments and recruiting expected to increase – have we already seen the bottom?**
  2. **Result 2: Over 50% of Finnish CTOs see that the value of their products and/or services could be highly improved by collaborating across industries**
  3. **Companies are losing a lot of money by not being in Industrial Symbiosis**

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# WHAT'S THE DATA BEHIND THE RESULTS

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# CTO Survey covers Finnish CTOs' views on the current innovation environment and its future outlook

**Spinverse** annually conducts the **CTO Survey**, targeted to Finnish Chief Technology Officers (CTO). The survey deals with themes that arise in the semi-annual CTO Forum events.

The CTO Survey 2013 was done in partnership with **Sitra and Technology Academy Finland (TAF)**

Survey received nearly **100 qualified responses**, complemented by several deeper interviews of representatives from large companies

Over 1/3 (37%) of the responses were from **big corporations**

The results of the survey are **compared to the previous years**.

The focus theme of 2013 was *Industrial Symbiosis*

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# Nearly half of the TOP 100 R&D investors in Finland answered the survey, added by other significant Finnish companies

## Examples:

- ABB Oyj\*
- Cargotec Oyj
- Cassidian Finland Oy
- Efore Oyj
- Enoro Oy
- Ensto Group
- Fortum Oyj
- F-Secure Oyj
- HKScan Oyj
- Kemppi Oy
- Kone Oyj
- KWH Mirka Oy Ab
- Lemminkäinen Talo Oy
- Metso Group
- Metsä Fibre Oy
- Neste Oil Oyj
- Okmetic Oyj
- Orion Diagnostica Oy
- Outokumpu Stainless Oy
- Outotec (Finland) Oy
- Patria Oyj
- Planmeca Oy\*
- Ponsse Oyj
- Rovio Entertainment Oy
- Sandvik Oyj\*
- Tieto Oyj
- Tikkurila Oyj\*
- UPM-Kymmene Oy
- Vaisala Oyj
- Valio Oy
- Valmet Automotive Oy
- Wärtsilä Oyj Abp

\* Interview

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# MAIN FINDINGS

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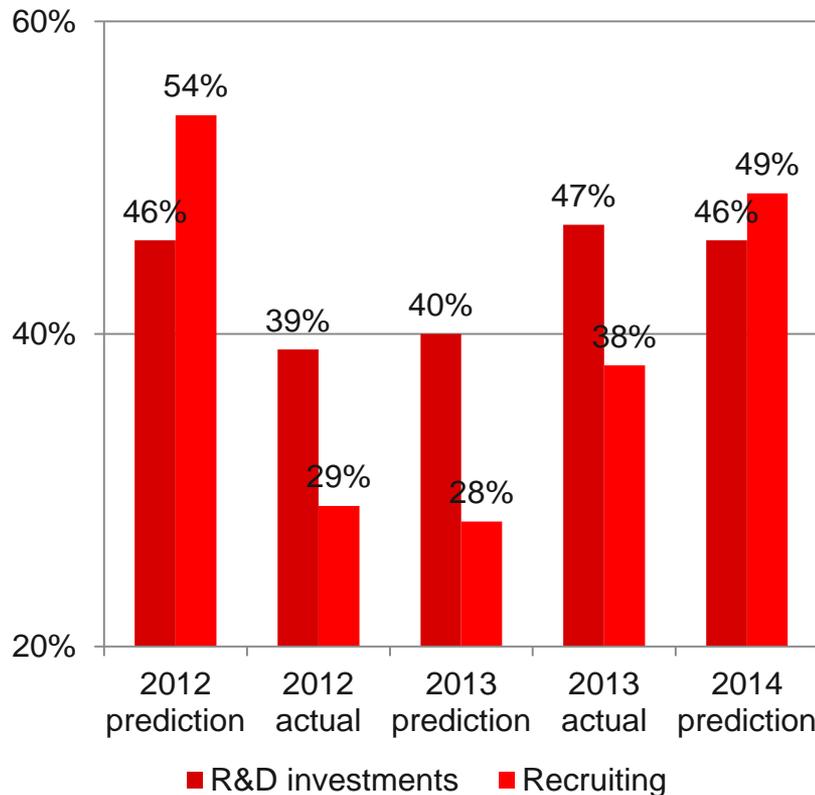
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# Result 1: R&D investments and recruiting expected to increase – have we already seen the bottom?

Share of CTOs who are planning on increasing their budget or recruiting



## Key takeaway points

- CTOs expect next year to be brighter than the previous ones
- The share of companies expecting to increase R&D efforts is on the rise
- Positive outlook also on indicators about the number of new product/service launches, new R&D projects, and patent filings

## Quotes from the interviews

- "Finland is a cost efficient R&D location in Europe"
- "Public funding support for R&D has been one of the key factors affecting our decision in keeping the R&D unit here – at least for the next 10 years."



**MANY ARE INCREASING INVESTMENTS –  
BUT WHAT IS THE OVERALL PICTURE**

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# We need to work on keeping R&D in Finland: Unfortunately the overall R&D expenditure is dependent on Nokia

## Suomen suurimmat tutkijat 2012

Sija	Yritys	T&K milj. euroa	T&K % liikevaihdosta	Muutos edell. v:sta, %	Liikevaihto milj. euroa	Toimiala	Sija	Yritys	T&K milj. euroa	T&K % liikevaihdosta	Muutos edell. v:sta, %	Liikevaihto milj. euroa	Toimiala
1	Nokia	4782	15,8	-14	30176	tietoliikenne	26	Konecranes	26	1,2	-13	2170	metalli
2	Wärtsilä	188	4,0	16	4725	metalli	27	Rautaruukki	26	1,0	-10	2789	metalli
3	ABB-Yhtiöt	184	7,8	13	2360	metalli	28	Vacon	25	6,5	0	388	sähkötekniikka
4	Metso	126	1,7	4	7504	metalli	29	Biotie Therapies	24	502,0	-31	5	biotekniikka
5	Orion	105	10,7	20	980	lääke	30	Teollisuuden Voima	24	6,8	-5	352	energia
6	OP-Pohjola	97	1,4	45	6848	rahoitus	31	Elektrobit	22	12,0	0	185	elektroniikka
7	LM Ericsson	87	51,8	85	168	tietoliikenne	32	YIT	22	0,5	7	4676	rakentaminen
8	Kone	86	1,4	4	6277	metalli	33	Metsä Board	20	0,4	5	2108	metsä
9	Stora Enso	81	0,7	1	10815	metsä	34	Comptel	18,6	22,5	21	82	ohjelmistot
10	Cargotec	75	2,3	26	3327	metalli	35	Outokumpu	18,0	0,4	-14	4538	metalli
11	Amer Sports	72	3,5	12	2064	moniala	36	Basware	17,9	15,7	8	114	ohjelmistot
12	Tellabs	58	23,7	11	245	tietoliikenne	37	Ahlstrom	17,0	1,7	6	1011	metsä
13	Sandvik Mining	51	5,2	39	996	metalli	38	Nokian Renkaat	16,9	1,0	12	1612	kumi
14	F-Secure	49	31,4	25	157	ohjelmistot	39	Agco Sisu Power	16,6	5,8	15	287	metalli
15	UPM	45	0,4	-10	10438	metsä	40	Uponor	15,9	2,0	-2	812	muovi
16	Neste Oil	42	0,2	0	17853	kemia	41	Huhtamäki	15,6	0,7	-4	2335	pakkaus
17	Outotec	42	2,0	24	1386	metalli	42	John Deere Forestry	15,2	4,5	6	337	metsäkoneet
18	Fortum	41	0,7	8	6159	energia	43	Itella	15,2	0,8	7	1947	logistiikka
19	Kemira	38	1,7	2	2241	kemia	44	Borealis Polymers	15,1	8,5	-4	212	kemia
20	Tieto	38	2,1	-7	1825	ohjelmistot	45	Polar Electro	14,0	9,3	-7	151	elektroniikka
21	GE Healthcare Finland	31	11,8	7	263	lääketiet. tekniikka	46	Lemminkäinen	13,6	0,6	-11	2267	rakentaminen
22	Valio	29	1,4	6	2000	elintarvikkeet	47	Varian Medical Systems	13,1	51,6	6	27	lääketiede
23	Cassidian Finland	28	23,3	-3	120	tietoliikenne	48	Tecnotree	13,0	17,7	6	73	tietoliikenne
24	Vaisala	28	9,5	0	293	elektroniikka	49	Thermo Fisher Scientific	12,5	9,1	14	138	lääketiet. tekniikka
25	Patria Industries	28	3,9	11	736	metalli	50	Planmeca	12,0	5,6	21	213	lääketiet. tekniikka

Ref: Tekniikka ja Talous 14.6.2013

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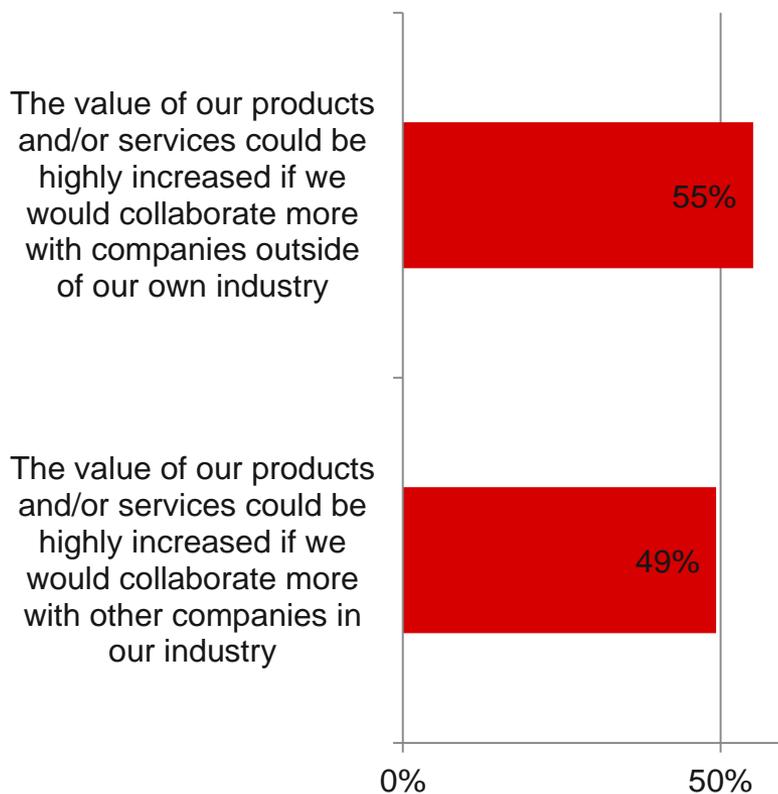
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# Result 2: Over 50% of Finnish CTOs see that the value of their products and/or services could be highly improved by collaborating across industries

Could your company benefit from industrial symbiosis?



n=69

## Key takeaway points

- Horizon 2020 is aiming to enhance cross-industry collaboration
- Joint piloting and demonstrations as a key tool
- SMEs can act as intermediates in the collaboration between large companies

## Quotes from the interviews

- "Big industrial companies shall receive public support from Tekes ONLY if they cooperate with INNOVATIVE SMEs in the frame of the grant. This will boost innovation processes in big companies, as well as open new market channels for SMEs"

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**OPEN INNOVATION AND COLLABORATING  
ACCROSS INDUSTRIES REQUIRES TIME,  
MONEY AND EFFORTS – PUBLIC FUNDING  
IS AVAILABLE**

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69 Billion  
Euros

# Horizon 2020 - an underused funding opportunity?



**70% or 100% funding rates for**



SMEs



Industry



Pilots and demonstrations



Higher technology readiness level  
product development



Industry collaboration

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# The History's biggest chunk of collaboration money will be launched in December

## Timeline of H2020 calls



# Result 3: CTOs see that tax deductibility of costs and Tekes-funding would enhance the adoption of Industrial symbiosis initiatives in Finland

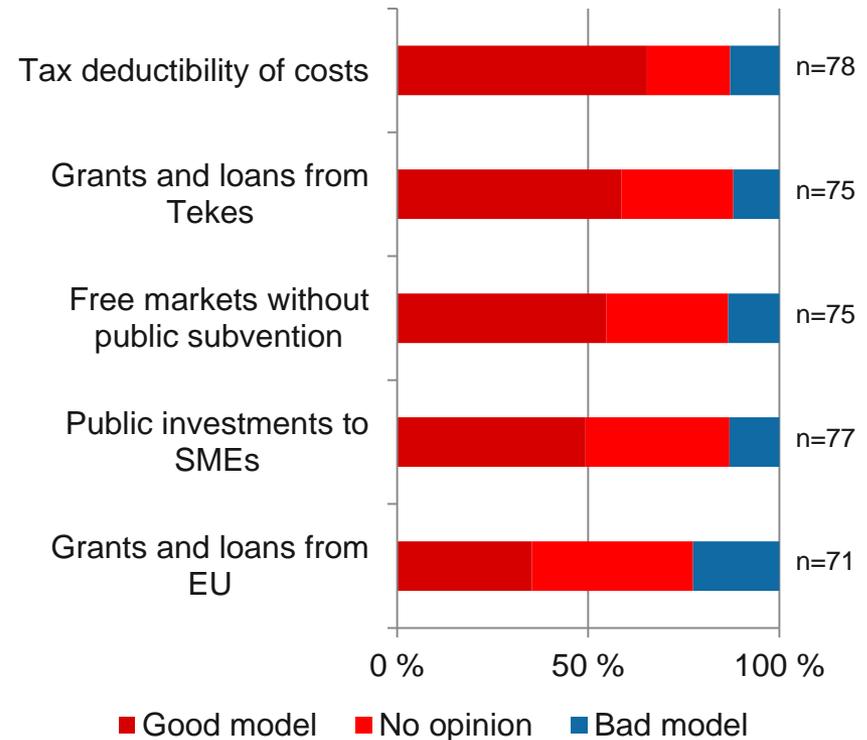
## Key takeaway points

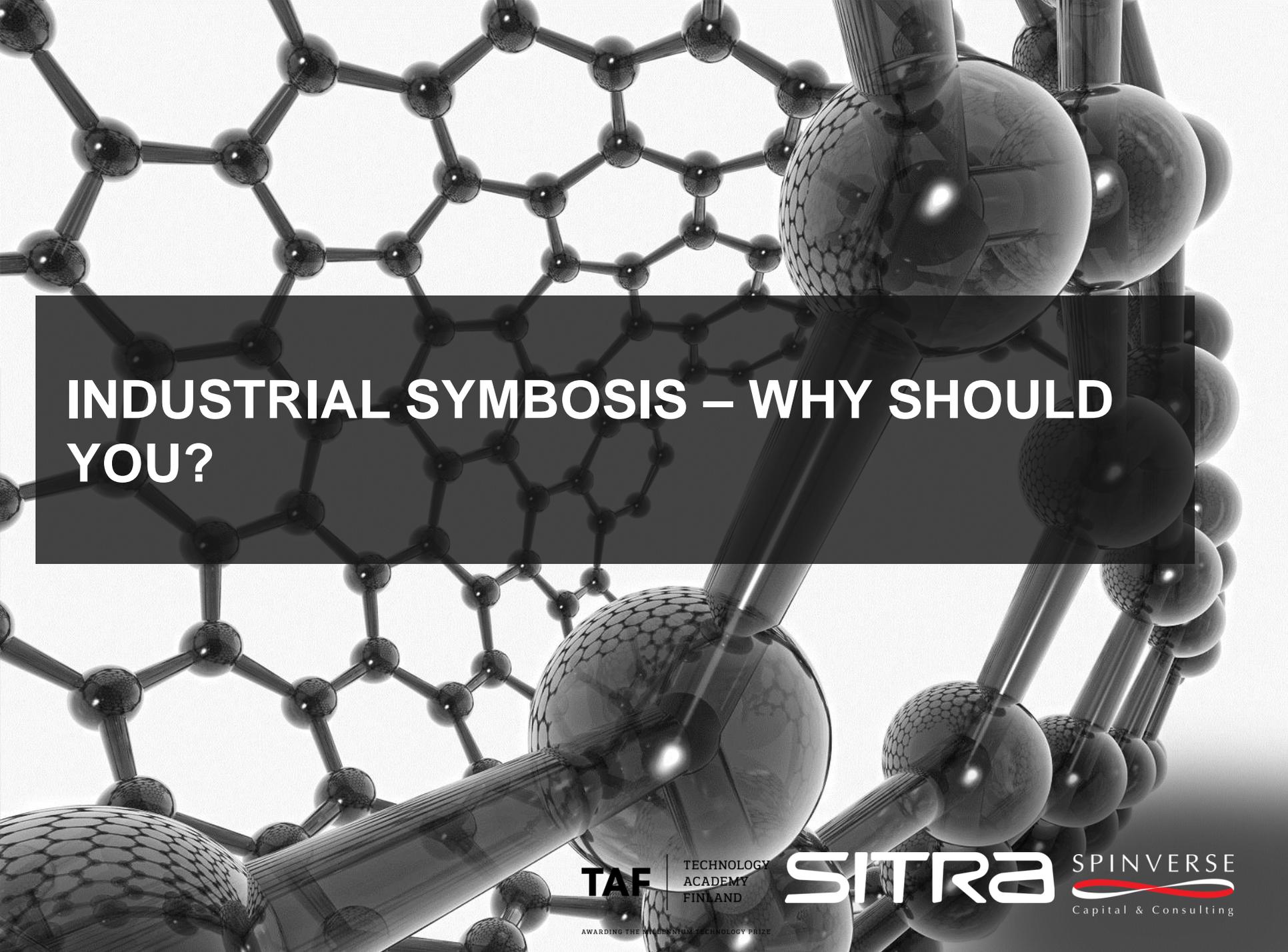
- Resource circulation was identified as important topic
- Company strategy and profitability drivers were seen as dealmakers for adopting industrial symbiosis

## Quotes from interviews

- "Companies are losing a lot of money by not sorting their waste flows"
- "We recirculate valuable materials from our waste back to our operations in collaboration with an external waste management partner"

## What are the most natural funding models for encouraging industrial symbiosis initiatives in Finland?





# INDUSTRIAL SYMBIOSIS – WHY SHOULD YOU?

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**Your waste can be somebody else's gold.**

**Why not explore the business opportunity?**

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# Many more interesting results can be found at [www.spinverse.com](http://www.spinverse.com)

- Almost half of the CTOs plan increases to the R&D budget for 2014 – Also, 2013 is more positive than what was expected in 2012
- The greatest number of growing R&D budgets are expected in Chemical and ICT industries, the rest are more or less stable
- CTOs have a positive outlook for 2014 in terms of recruiting new R&D personnel – the trend seems to go upwards from the tough 2012
- Overall the R&D team sizes are expected to be quite stable; with >20% companies expecting to increase the team size across industries
- Over a half of the companies introduce an increasing number of products or services to the markets each year
- SHOKs are clearly more important for big companies than for SMEs. EU funding is only important for a third of the CTOs.
- The importance of Tekes is rather high across the different sizes of companies – Medium sized companies seem to value Tekes the least
- 97% of companies who have >15% of their R&D budget covered by public sources are SMEs
- 81% of ALL respondents agree that the tax deductibility of R&D costs was a useful initiative for boosting R&D in Finland
- The tax deduction is seen as very useful in almost all industries; in FPP the companies were most critical towards the model

# Many more interesting results can be found at [www.spinverse.com](http://www.spinverse.com)

- 68% of respondents consider resource circulation in their company's operations or assess it to be important in the future
- Resource intensive industries (FPP, MME, En, Chem) consider Resource Circulation to be important to both strategy and operations
- Business drivers were the most important factors for driving industrial symbiosis in the respondent's companies
- Over 50% of the respondents see high value potential in collaborating with other industries
- ~20% of respondents feel that it is difficult or very difficult to get information about suitable excess resource flows for creating value
- The preferred way for gathering information about the available resource flows depends on the perceived difficulty of the process

# CTO Workshops to be held in Uunisaari 10.10. based on the Survey results

- **Industrial symbiosis – the realization of the possibilities in Finland**
  - Chaired by Kenneth Ekman, CEO of CrisolteQ
- **Demonstrations and piloting with cross-industry players**
  - Chaired by Heli Antila, CTO of Fortum
- **Doing technology fore-sighting right**
  - Chaired by Stefano Mosconi, CTO of Jolla
- **The progress of digitization in Finnish Industries; proceedings of the ICT 2015 workgroup**
  - Chaired by Antti Ritvos, CTO of Tieto
- **Finding the right balance between marketing and R&D**
  - Chaired by Ilkka Mannonen, Head of Offering and CTO, Weather Business Vaisala

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# Agenda for Today

12.45: Welcome to the CTO Forum

**Pekka Koponen**, CEO of Spinverse,

**Jyri Arponen**, Business Director, Industrial Symbiosis of Sitra,

**Juha Ylä-Jääski**, CEO of TAF

13.00: CTO of the Year –launch of the competition

**Yrjö Neuvo**, chairman of the CTO of the Year Jury

13.20: *Best practice European examples of resource management, energy efficiency, and building business models on sustainable use of natural resources*

**Peter Laybourn**, CEO of International Synergies.

13.40: *CTO community in Europe: networks, best practices in R&D and innovation management*

**Michel Judkiewicz**, Secretary General of European Industrial Research Management Association (EIRMA).

14.00: Coffee

14.30: Presentation of the CTO Survey 2013 results

**Laura Kauhanen**, Director, Europe of Spinverse

15.00: CTO Workgroups

16.30: Summary of workgroups

17.00: Networking

Next CTO Event  
16.1.2014  
at Aalto Design Factory

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# CTO Survey 2014 – Full Results

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# CTO Survey 2013

## Introduction

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The results of the survey are **compared to the previous years.**

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The focus theme of 2013 was *Industrial Symbiosis*

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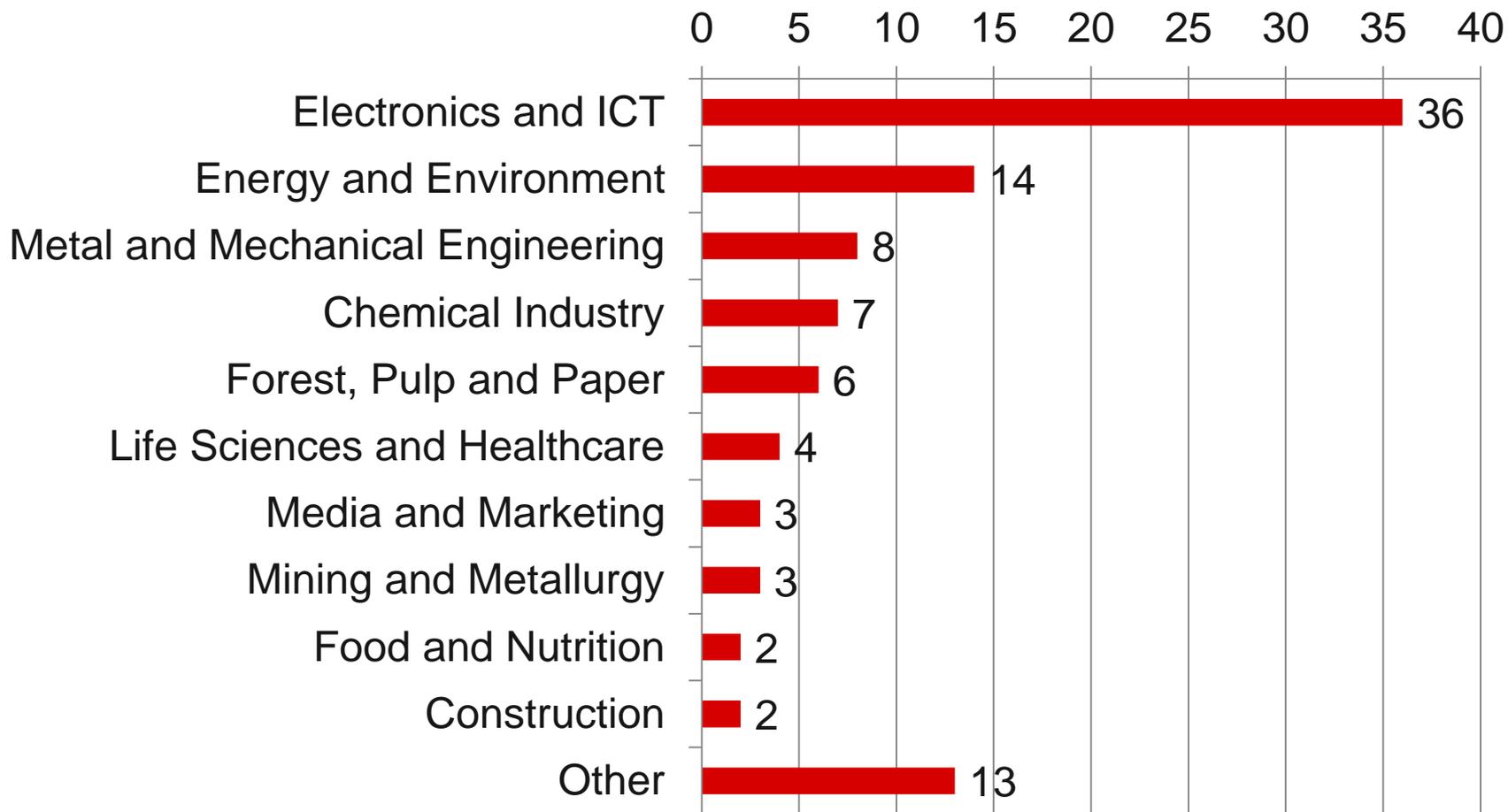
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# Nearly half of the TOP 100 R&D investors in Finland answered the survey, added by other significant Finnish companies

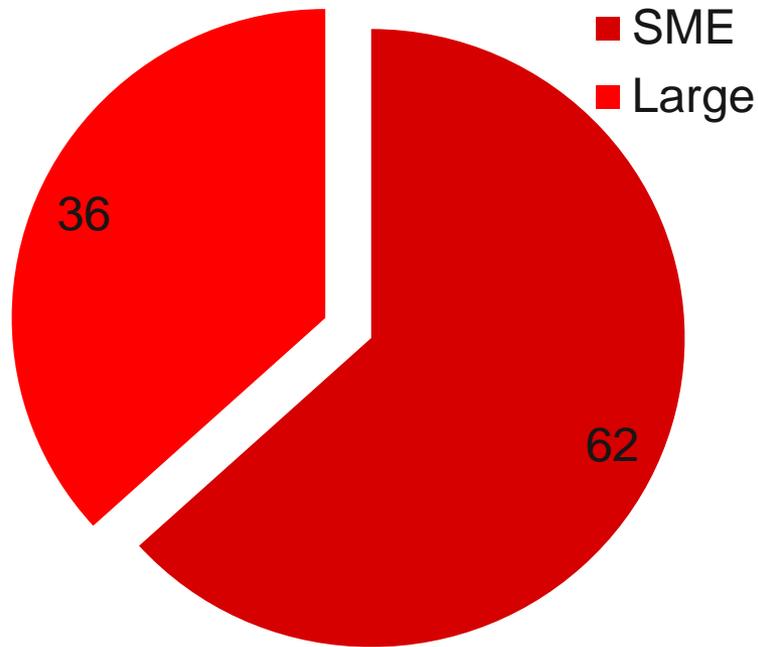
## Examples:

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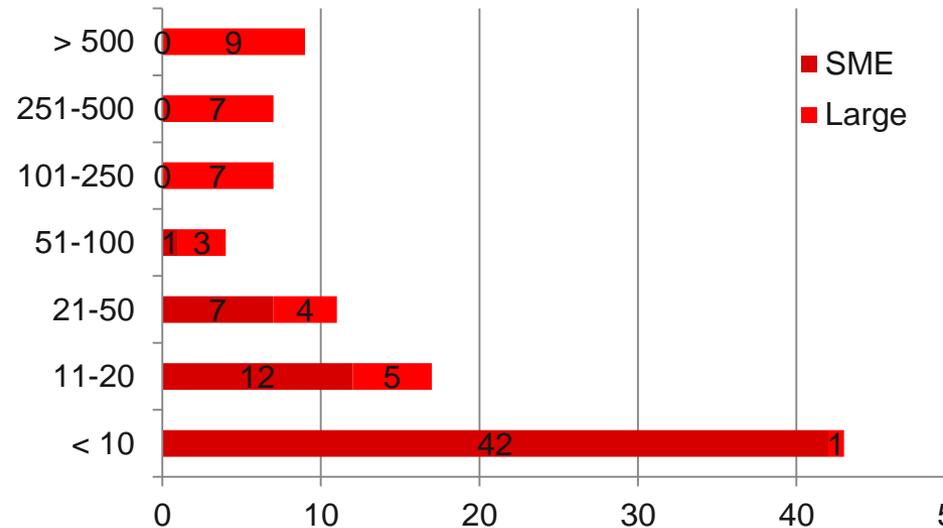
# The main part of the respondents are from technology-intensive industries



# This year SMEs represent a higher portion (63%) of the answers than previously (~50%)



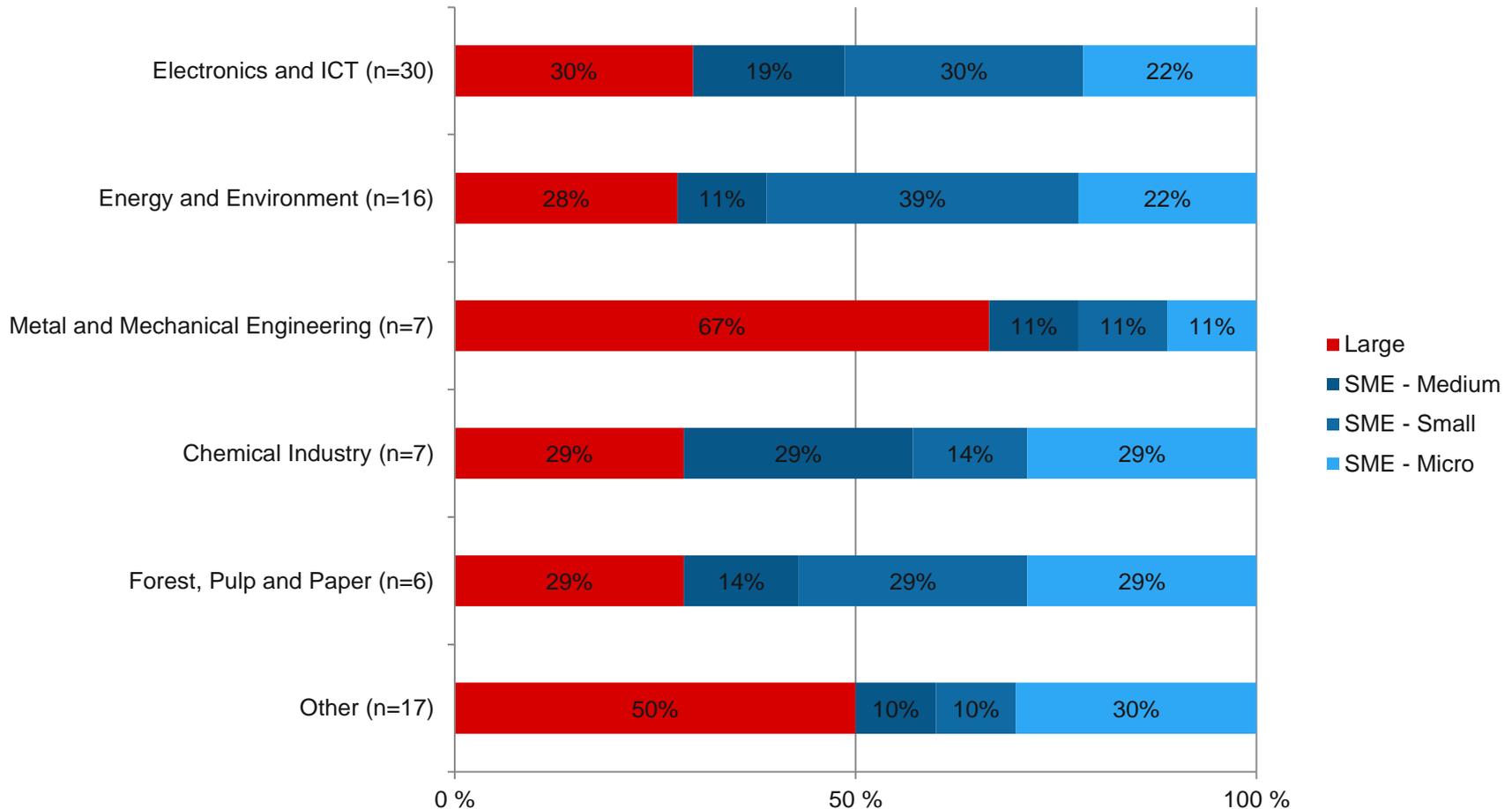
About 2/3 (63 %) of the responses are from SMEs



**Small companies have a rather small number of R&D employees, big companies more varying numbers.**

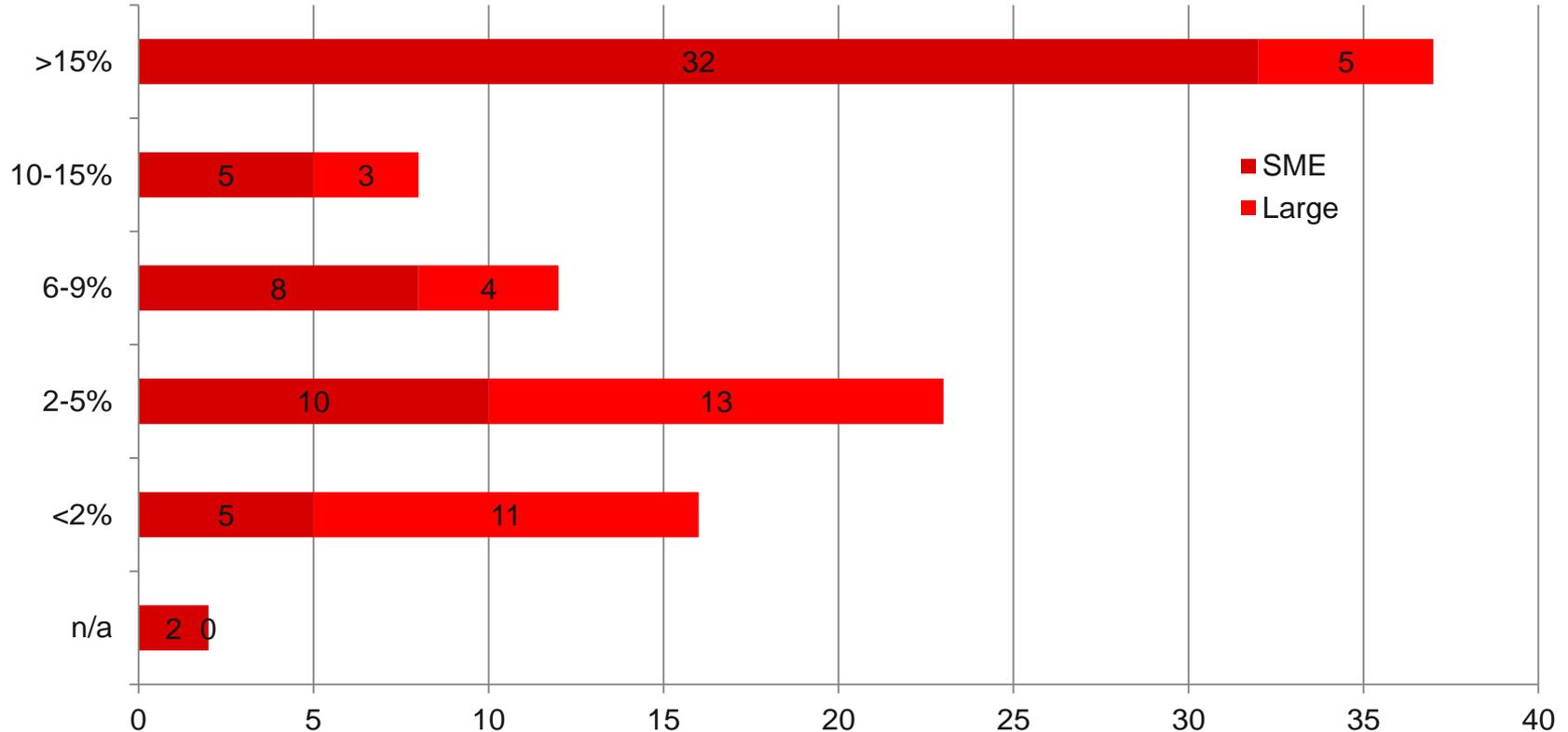
Almost half (43 %) of the companies have less than 10 R&D employees, only about 23 % more than 100.

# The company size distribution across industries is quite even, MME is the only one where large company representation is considerably higher



# R&D budgets vary between companies.

## In general, SMEs use a bigger percentage of their revenues to R&D



Over half (60%) of SMEs but only 22 % of big companies use more than 10% of their revenues to R&D.

# CTO Outlook on 2014

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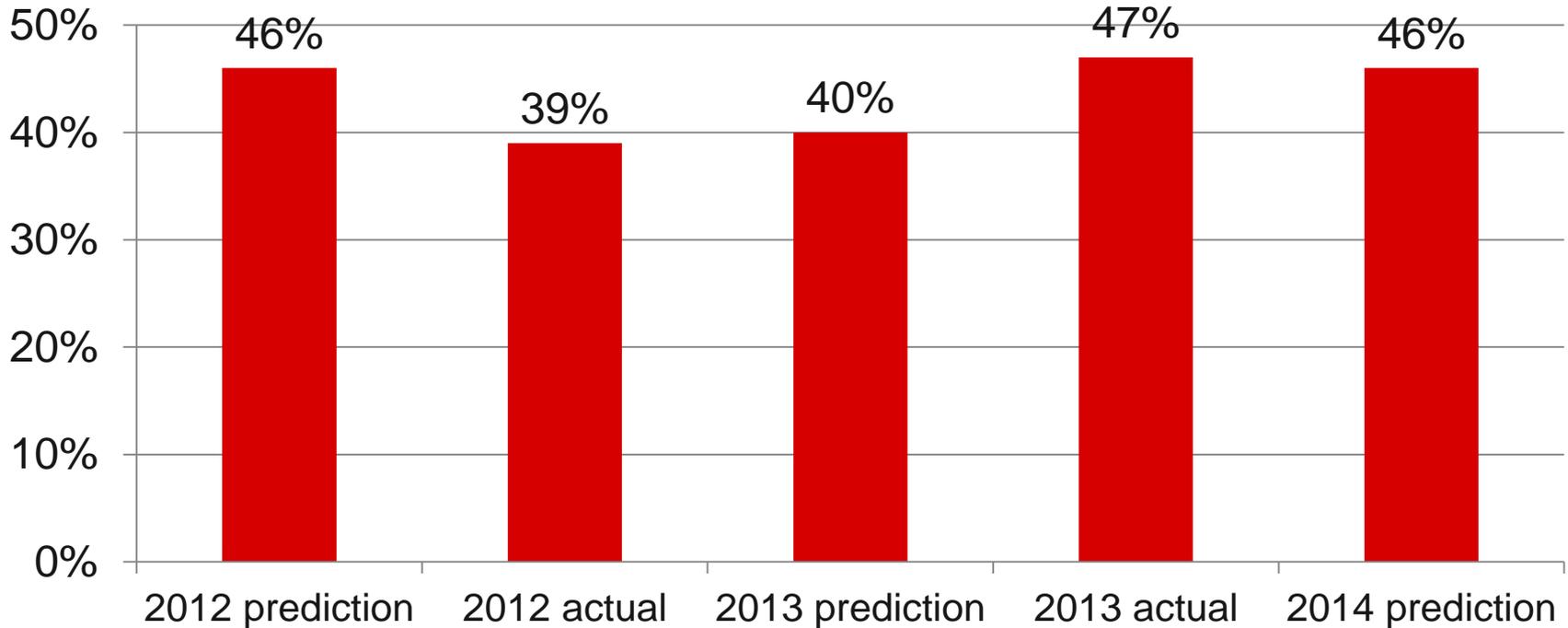
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# Almost half of the CTOs plan increases to the R&D budget for 2014 – Also, 2013 is more positive than what was expected in 2012

## CTOs who increase R&D investments



About 19% had decreases in 2013 and 13% had them in sight for 2014.

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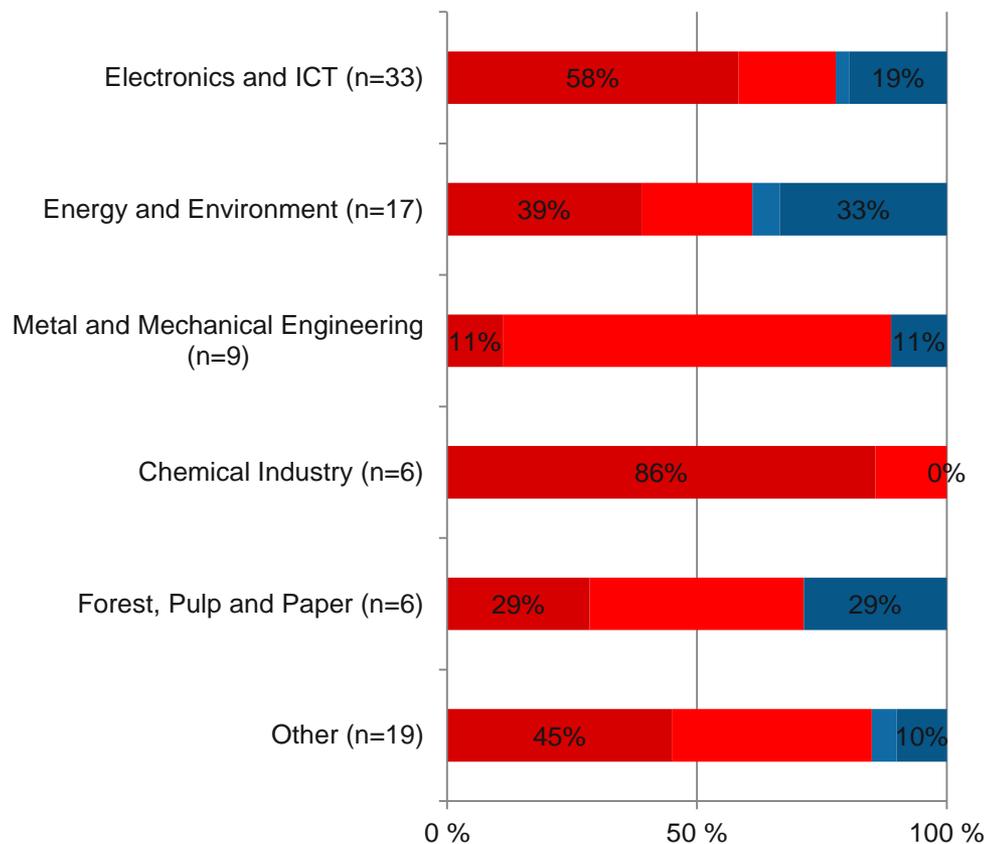
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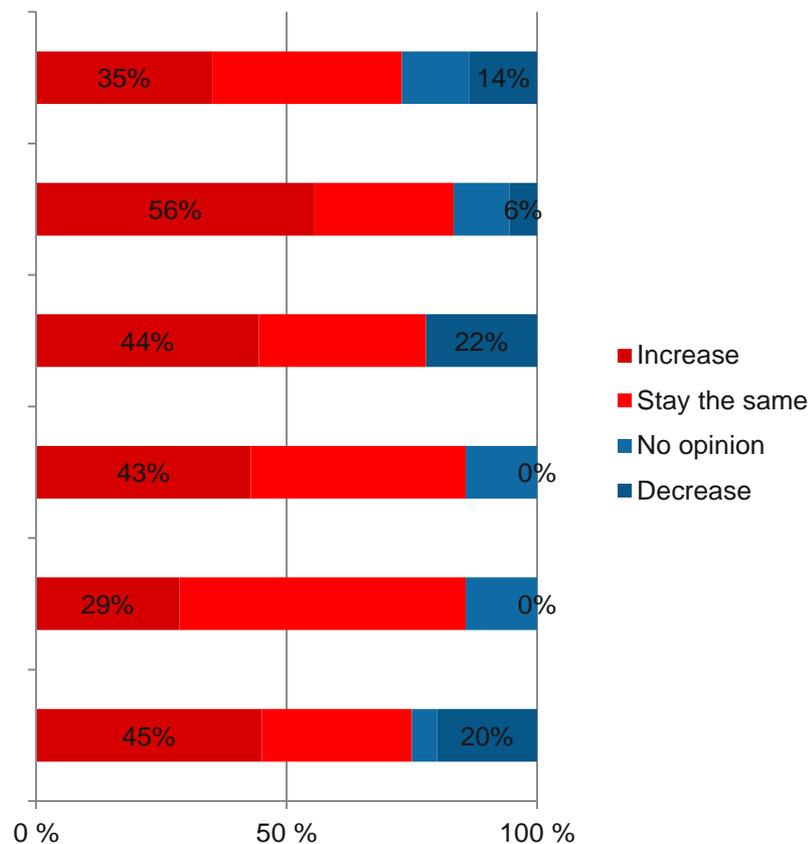
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# The greatest number of growing R&D budgets are expected in Chemical and ICT industries, the rest are more or less stable

## R&D Budget in 2013

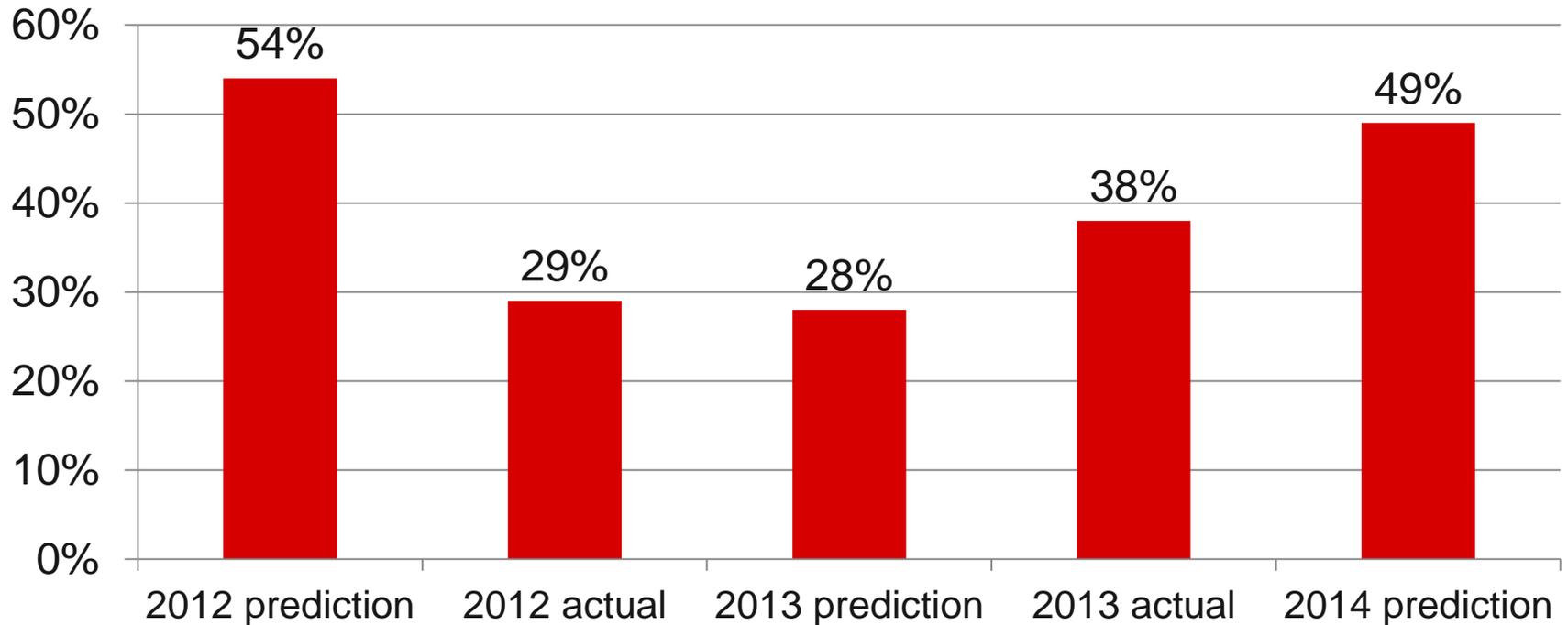


## R&D Budget in 2014



# CTOs have a positive outlook for 2014 in terms of recruiting new R&D personnel – the trend seems to go upwards from the tough 2012

## CTOs who increase R&D recruiting



However, 16% had to decrease R&D employees in 2013 while only 9% is foreseeing decreases in 2014.

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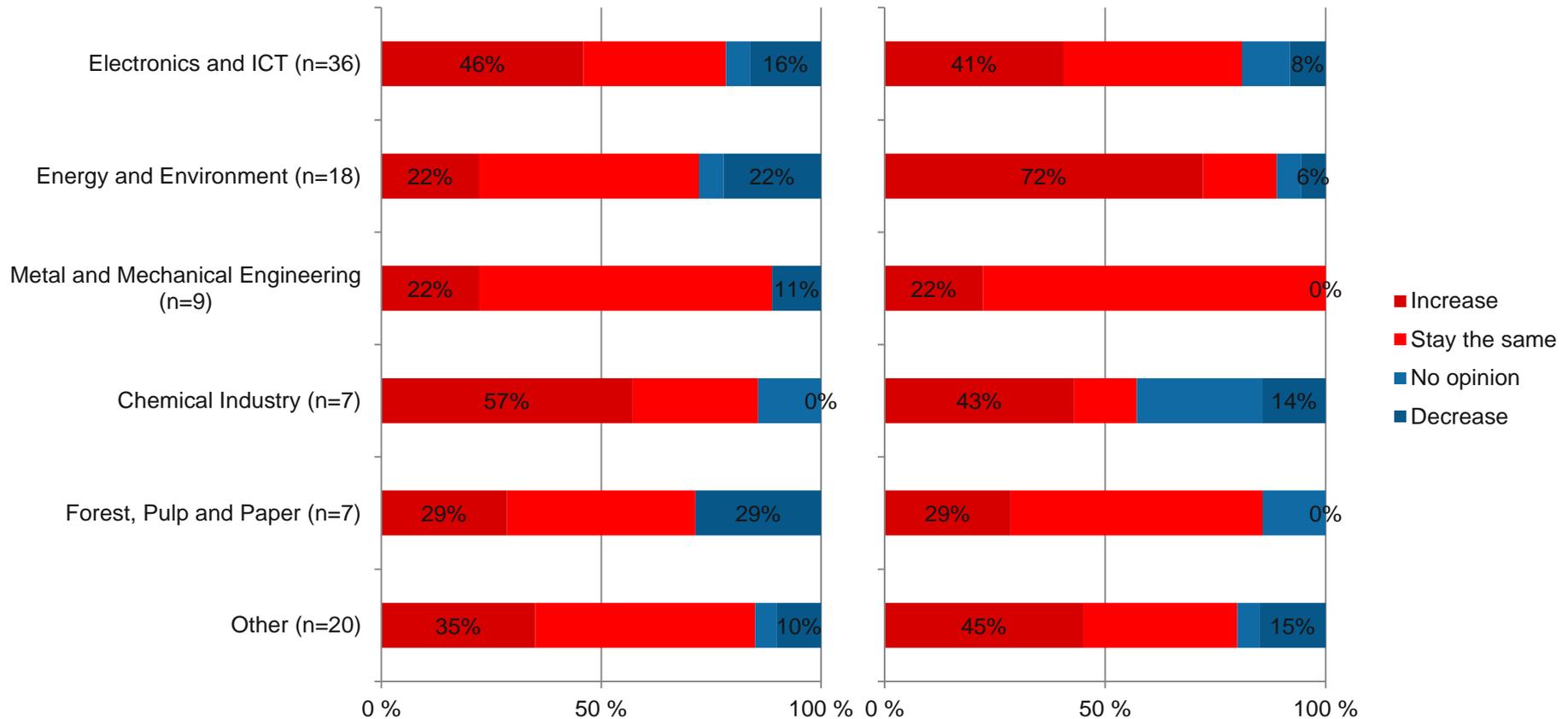
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# Overall the R&D team sizes are expected to be quite stable; with >20% companies expecting to increase the team size across industries

## R&D employees 2013

## R&D employees 2014



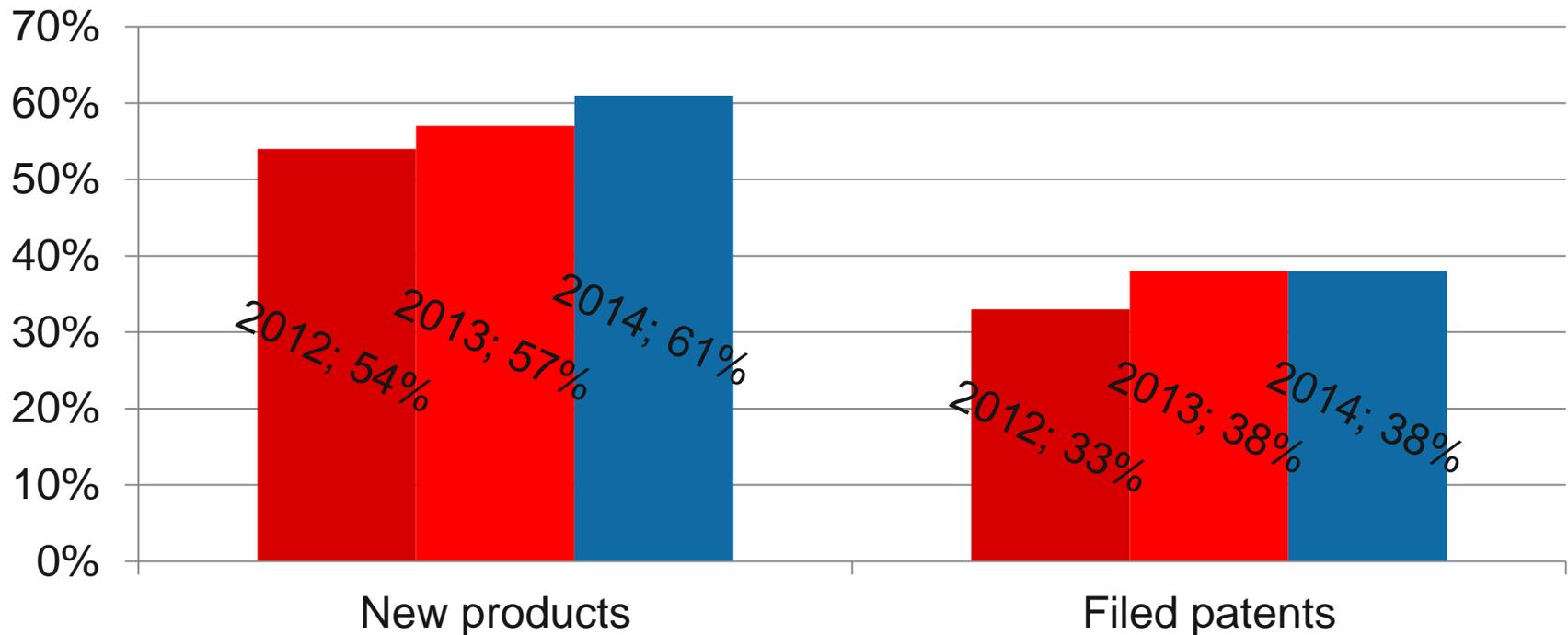
The positive outlook seems to be a bit higher towards the R&D team size than towards expected budget increases



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# Over a half of the companies introduce an increasing number of products or services to the markets each year



About 10% decreased the numbers of new products and patents in 2013. For the year 2014, 3% see decreases in the number of new products and 6% in the number of patents.

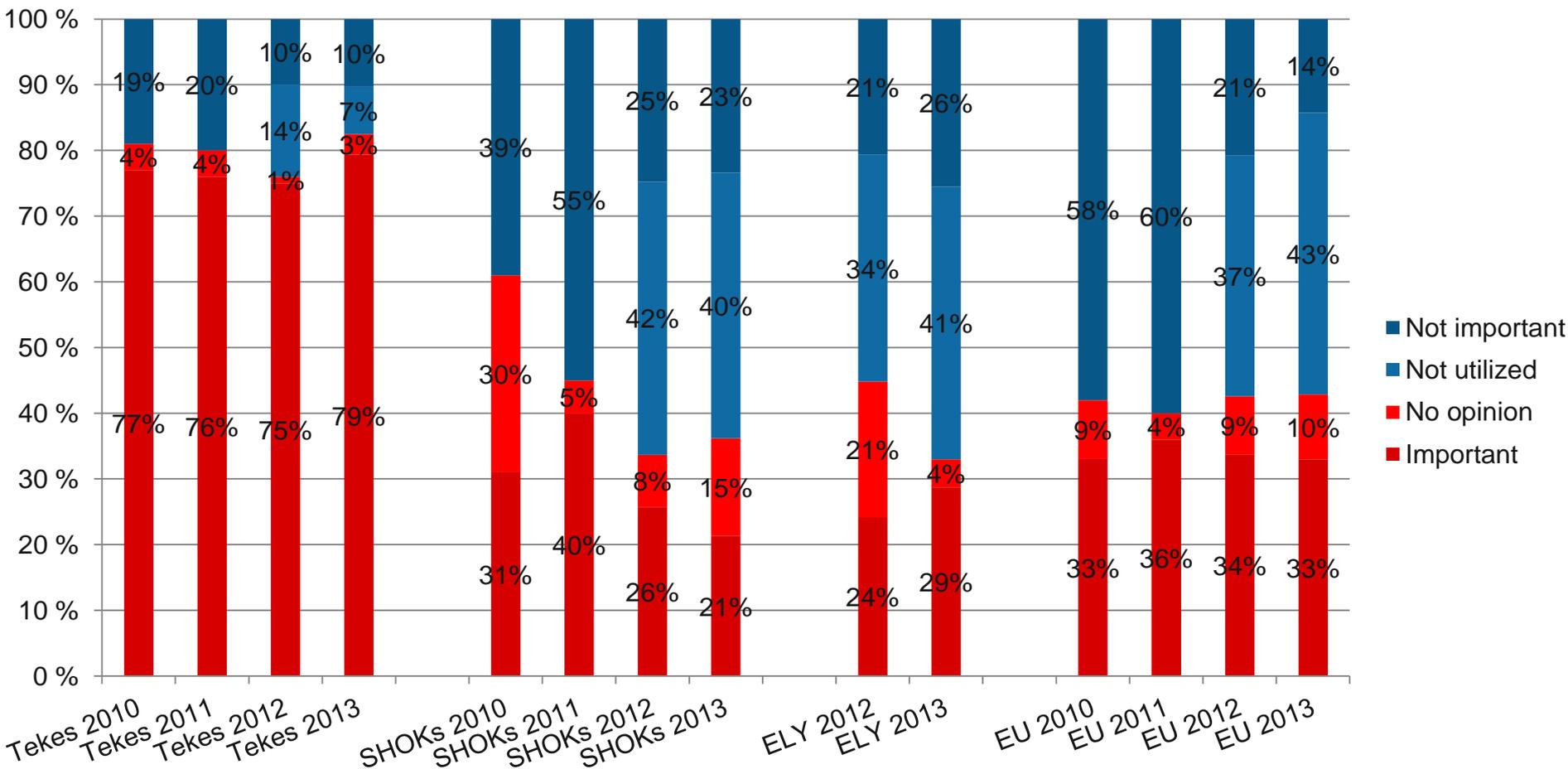
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# SHOKs are clearly more important for big companies than for SMEs. EU funding is only important for a third of the CTOs.



- In 2010 and 2011 figures, the “not utilized” opinion was not used
- 75% of the CTOs who stated SHOKs to be important were from big corporations

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# The importance of Tekes is rather high across the different sizes of companies – Medium sized companies seem to value Tekes the least

- Tekes is important for 86% of large companies
- Tekes is important for 75% of SMEs
  - Important for 66% of Medium companies
  - Important for 78% of Small and Micro

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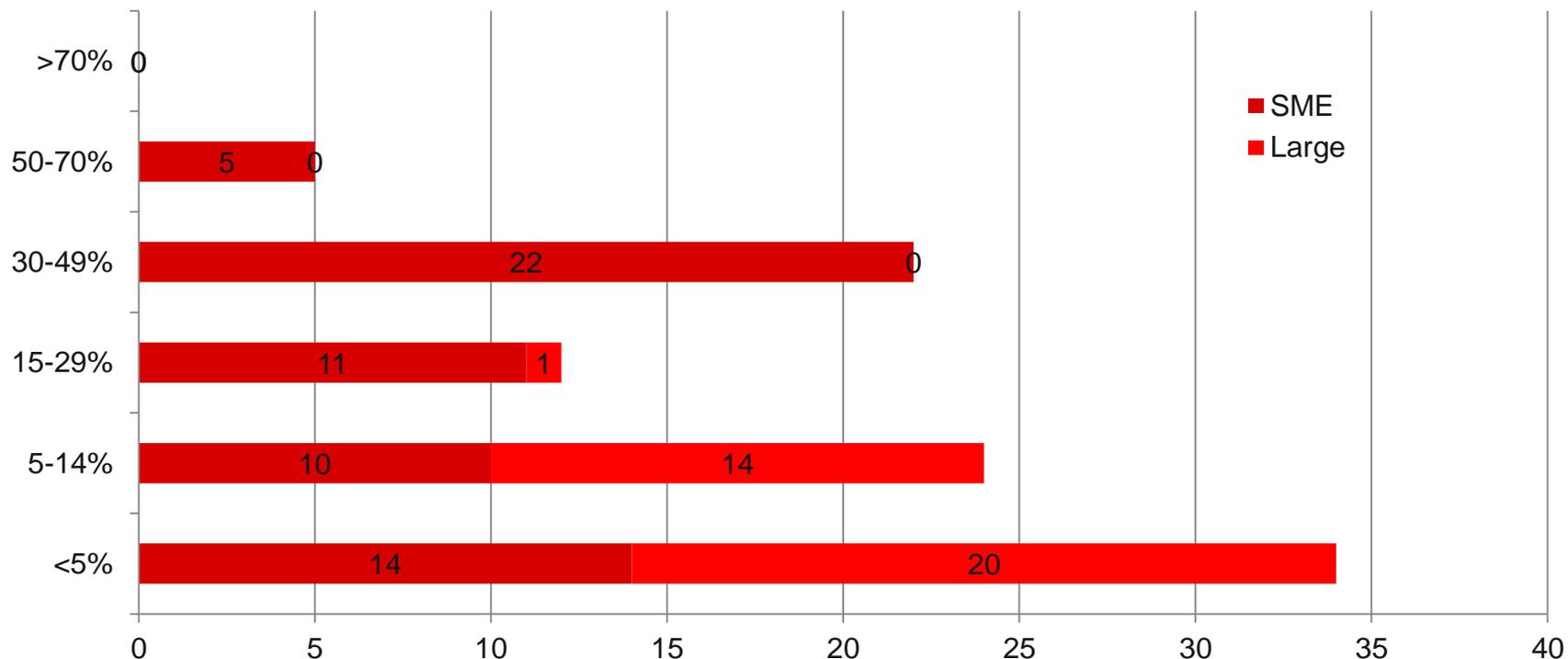
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# 97% of companies who have >15% of their R&D budget covered by public sources are SMEs

%-share of public funding from R&D investments



25% of companies who get more than 30% of their R&D funding from public sources are dissatisfied with their capabilities for securing public funding; from the comparison group only 13% are generally dissatisfied, however 31% of the comparison group are not happy with their performance in securing international public funding.

n=97

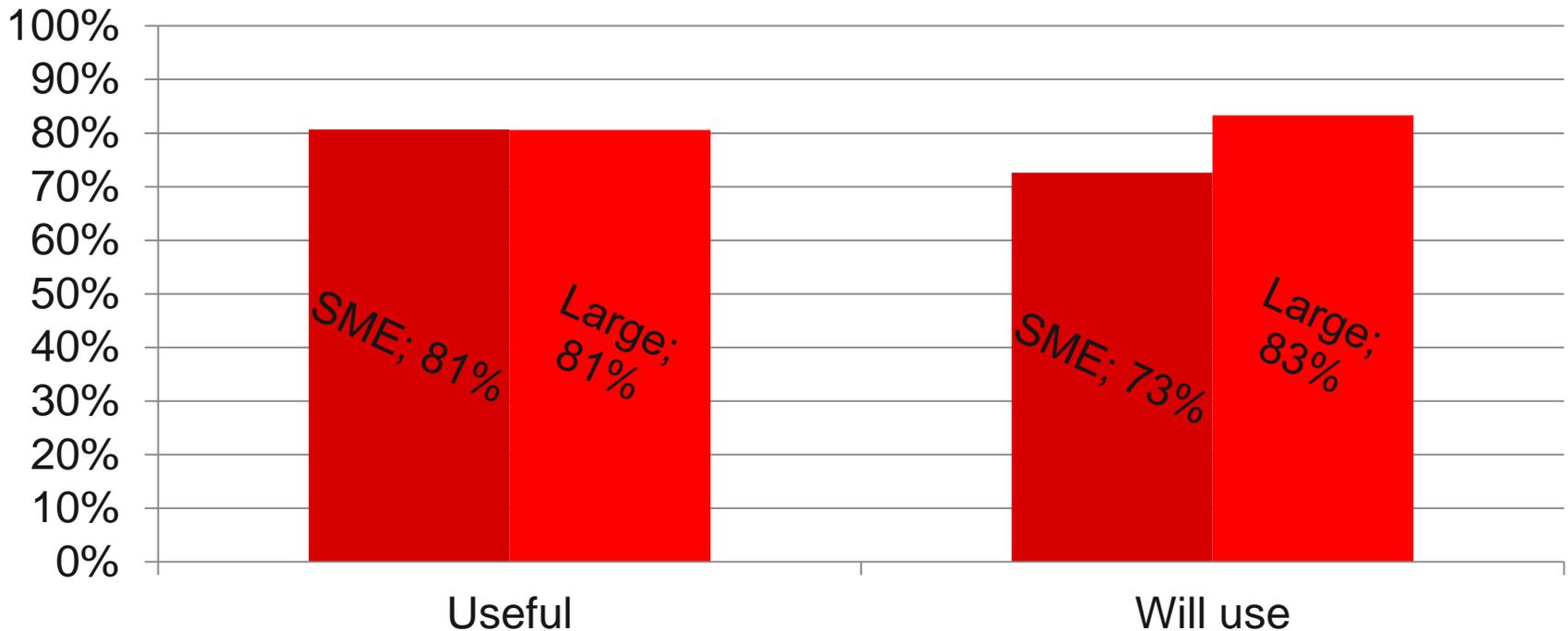
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# 81% of ALL respondents agree that the tax deductibility of R&D costs was a useful initiative for boosting R&D in Finland



n=98

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# Conclusion: The new R&D tax law boosts R&D in Finland significantly, but SMEs fail to utilize it

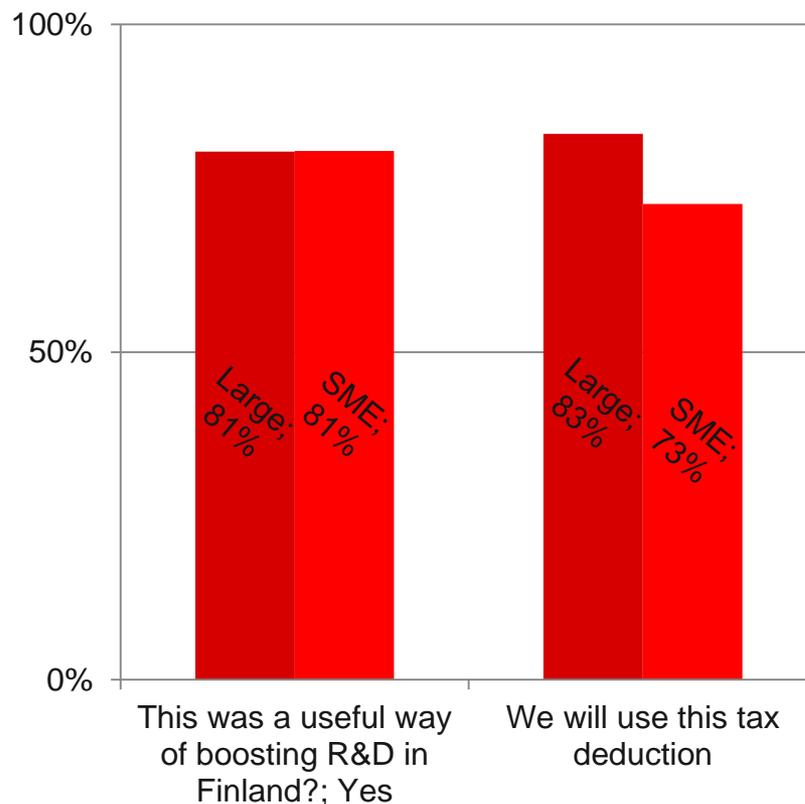
## Key takeaway points

- SMEs have had difficulties in understanding how to do accounting correctly to gain the maximum benefit of the deduction
- Initiative should be continued to help stabilize the strong R&D base in Finland

## Open comments

- "Tax deduction only works if you are paying tax"
- "Very important for grass roots R&D"
- "The law is valid for a too short time to say if it is good or not"

## Companies experiences about the R&D tax deduction law





# R&D TAX-DEDUCTION – WHO CAN USE IT?

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FINLAND

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AWARDING THE WILHELMINUM TECHNOLOGY PRIZE

# The tax deduction is applicable to cover employee costs of internal R&D

## Requirements

- Project plan
- Separate hour bookings
- Project employees salary paid in Finland
- Only salaries of own employees may be counted in

## Characteristics

- Max 400k€; min 15k€
- Based on application
- Approved costs mean 100% reduction from taxable revenues
  - If results in negative results in accounting, the loss is deductible from taxation during the next 10 years
- Is applicable also for start-up companies making losses before getting to profits

## Not eligible:

- R&D organizations
- Projects where other governmental subsidies have been used to cover costs (e.g. Tekes or EU projects)
- Companies that are older than three years and fulfill the description of a company in financial distress

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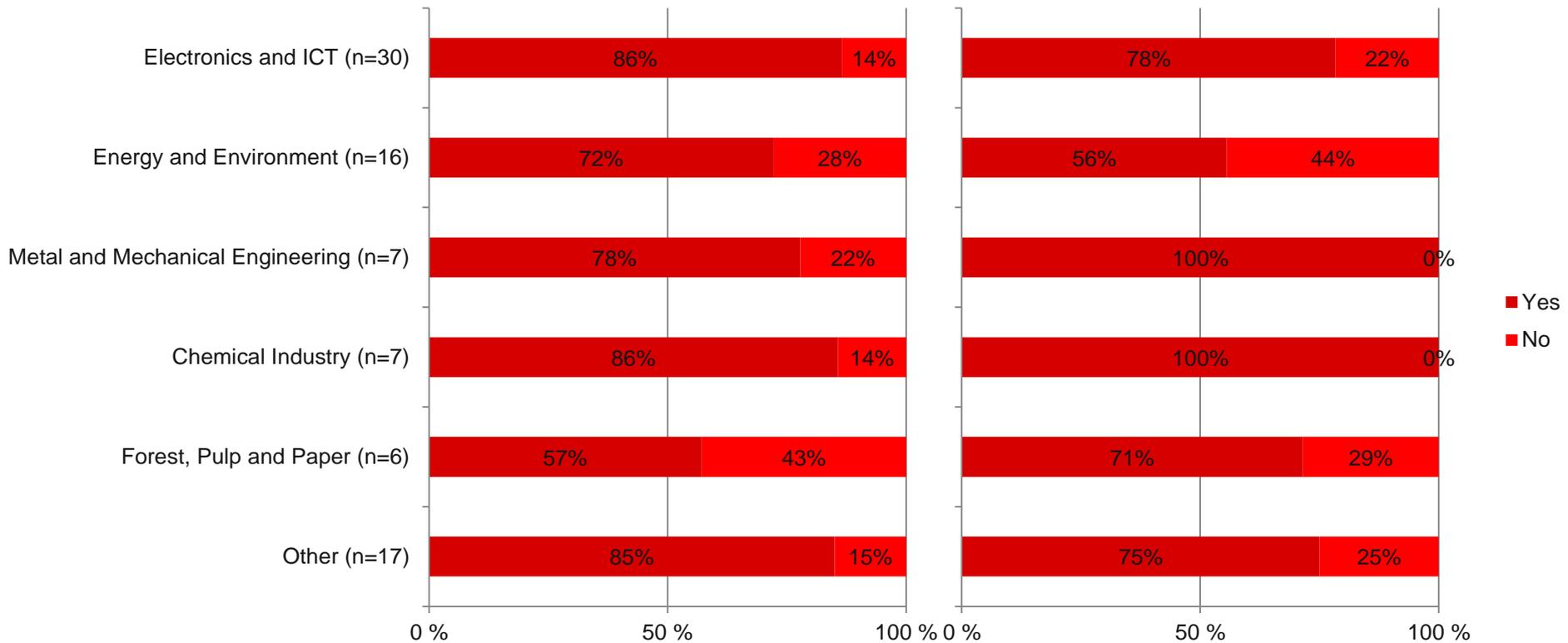
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# The tax deduction is seen as very useful in almost all industries; in FPP the companies were most critical towards the model

Do you think that tax deduction was a useful way of boosting R&D in Finland?

Are you going to use the tax deduction?



# Theme of 2013: Industrial symbiosis

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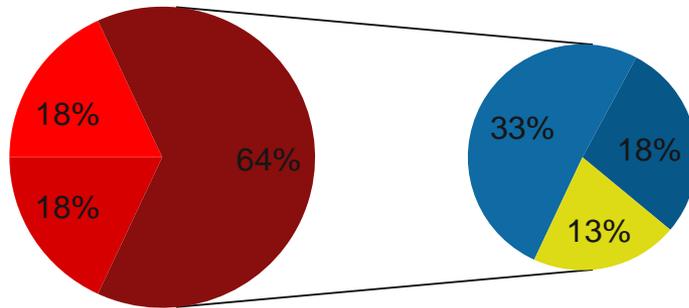
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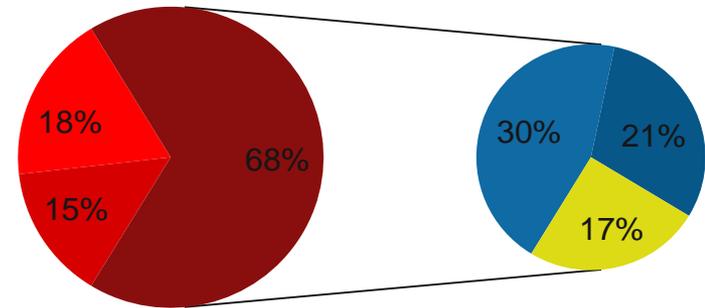
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# 68% of respondents consider resource circulation in their company's operations or assess it to be important in the future

Importance of resource circulation to your company's business strategy



Importance of resource circulation to your company's business operations



- No, this is not important factor for us
- Yes, this is important factor for us
- No, but this will be critical to our business in the future

- Not applicable
- Yes, but this is not very important factor for us

n=83

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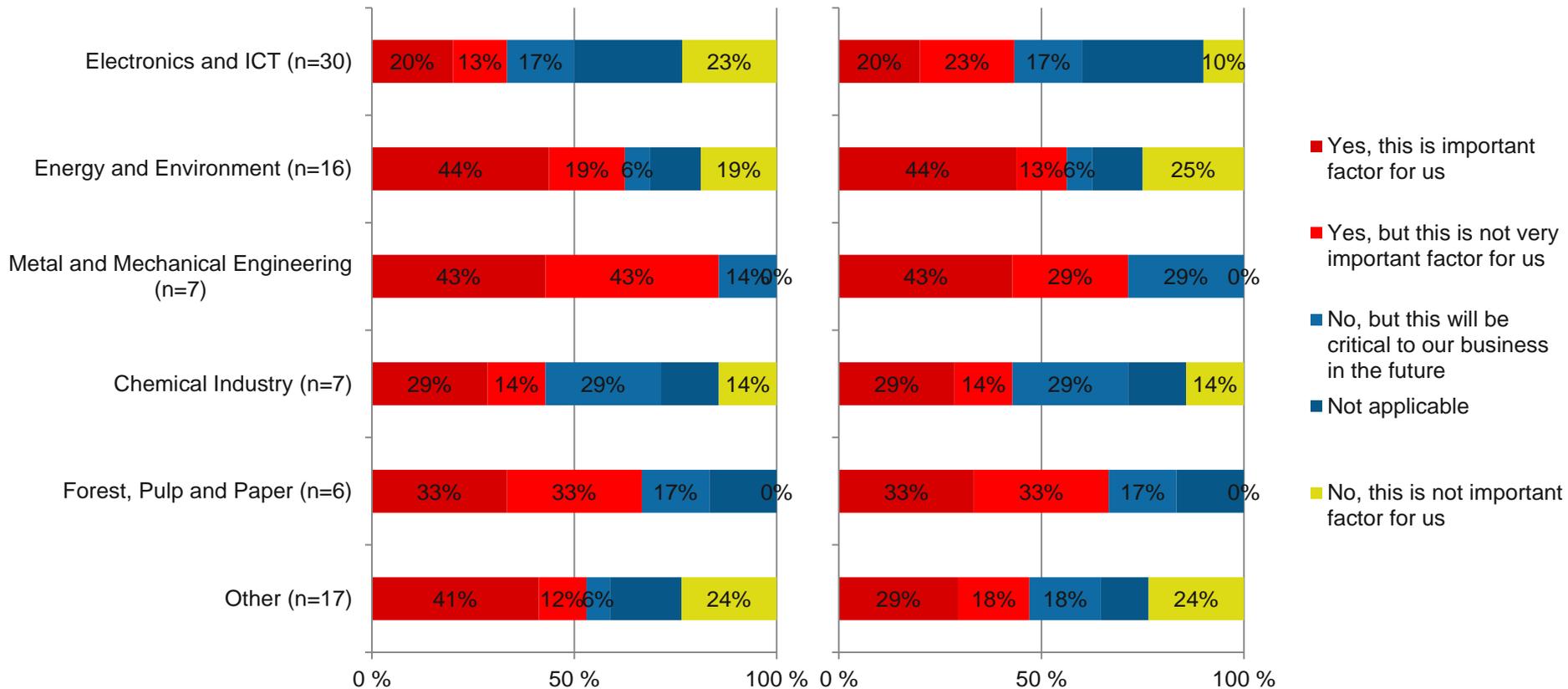
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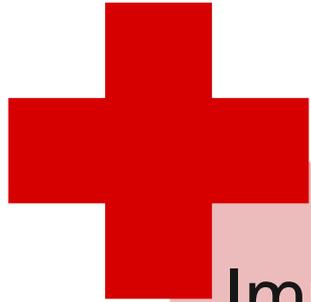
# Resource intensive industries (FPP, MME, En, Chem) consider Resource Circulation to be important to both strategy and operations

Importance of Resource Circulation to company's strategy

Importance of Resource Circulation to company's operations



# Business drivers were the most important factors for driving industrial symbiosis in the respondent's companies



Improved profitability (23)

Company strategy (21)

Cost reduction (12)

Entering new markets (10)

Environmental protection (6)

Positive brand image (4)

Regulation requirements (4)

Reducing waste (3)

n=83, order based on STV-method

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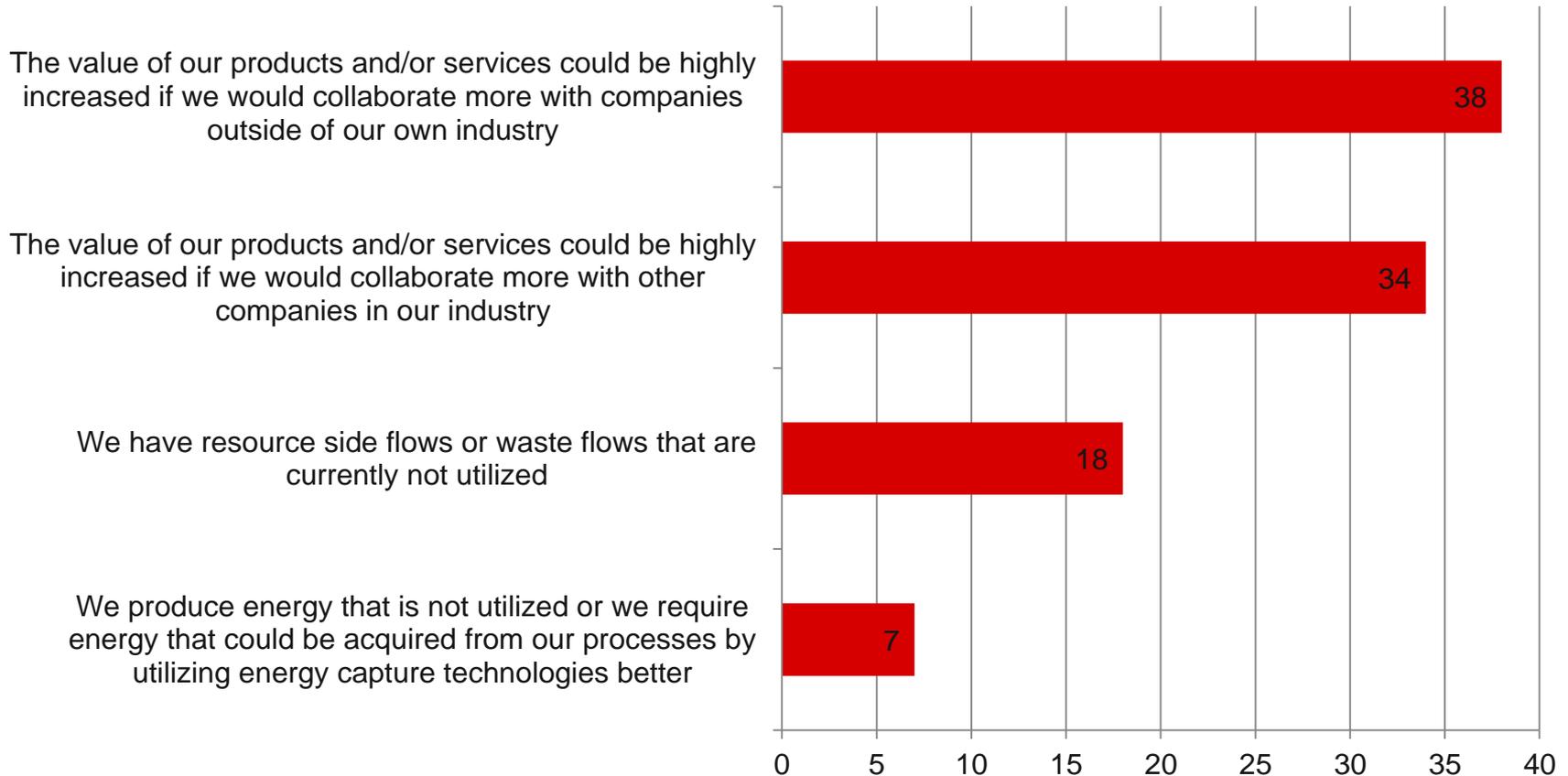
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AWARDING THE MILLENNIUM TECHNOLOGY PRIZE

# Over 50% of the respondents see high value potential in collaborating with other industries

## Could your company benefit from industrial symbiosis?



n=69

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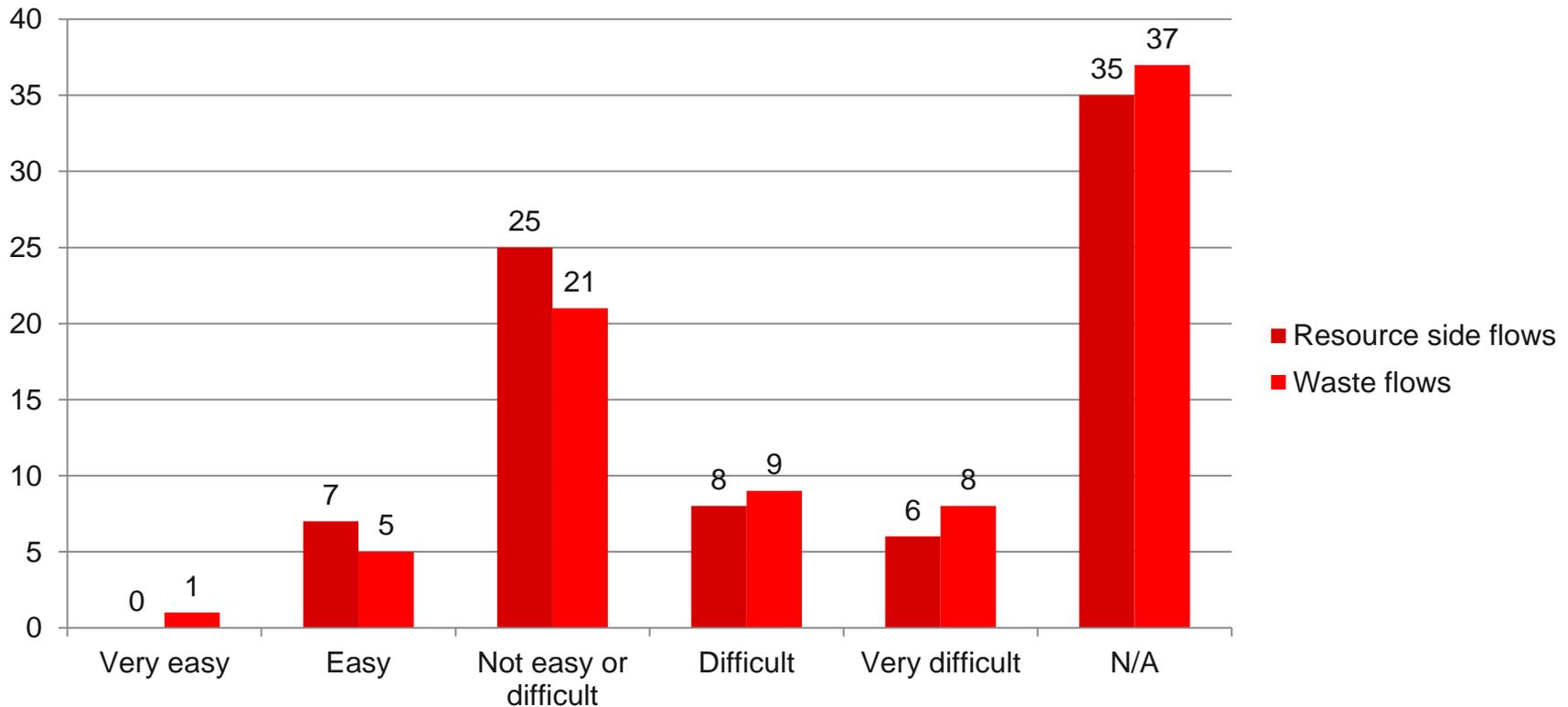
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# Additional points on Industrial Symbiosis

- 30 companies don't consider Resource circulation as important strategic topic
  - 14 of these see high added value from collaborating within industry
  - 12 of these see high added value from collaborating across industries
- 27 companies don't consider Resource circulation in their business operations
  - 13 of these see high added value from collaborating within industry
  - 10 of these see high added value from collaborating across industries
- 73% of companies who don't consider resource circulation a strategically important topic still see high added value potential in collaborating within or across industries
- 36% of large company respondents see value creation potential in within-industry collaboration, while 59% of SMEs feel the same way
- ~55% of both SMEs and large companies see value creation potential in cross-industry collaboration
- 39% of large company respondents have identified resource side flows or waste flows that could be better utilized for additional value creation

# ~20% of respondents feel that it is difficult or very difficult to get information about suitable excess resource flows for creating value

How easy it is for you to get information about other companies or industries resource flows that are currently underutilized but that could be a source of valuable resources to your company?



n=81

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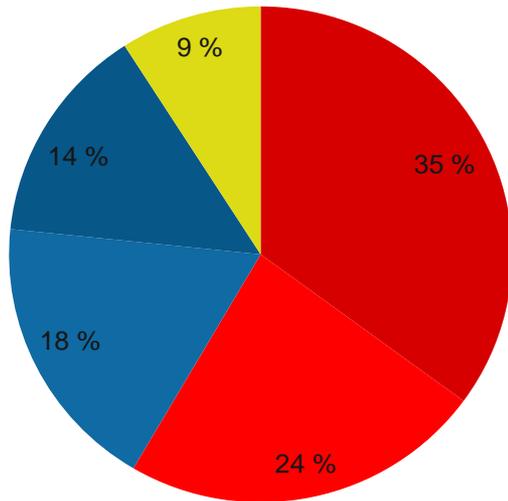
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# The preferred way for gathering information about the available resource flows depends on the perceived difficulty of the process

What would be your preferred method for gaining more information about available resources that are currently underutilized by other companies in other industries?

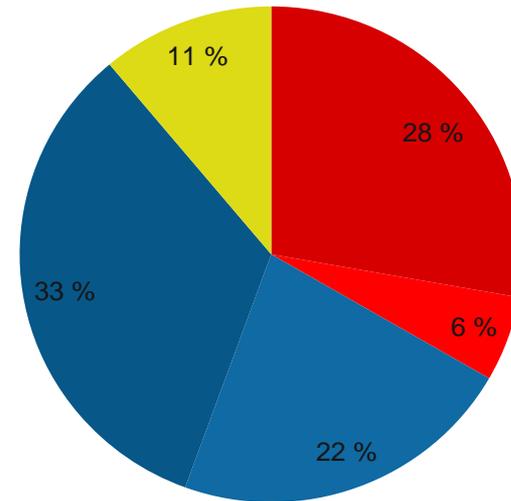
(all)



- Online database
- Professional service organizations
- Public regional organizations (e.g. ELY-keskus)

What would be your preferred method for gaining more information about available resources that are currently underutilized by other companies in other industries?

(companies who find this difficult)



- Proprietary market study
- Public national organizations (e.g. Tekes)

n=77 n=18

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# Tax breaks are seen as the most promising financial tool for encouraging industrial symbiosis in Finland

What are the most natural funding models for encouraging industrial symbiosis initiatives in Finland?

