PFAS in the food & beverage industry

combined quantitative and qualitative report

February 22, 2024

RESEARCH STRATEGY GROUP

contents

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background

- Although Per- and polyfluoroalkyl substances (PFAS), sometimes called 'forever chemicals', have been used in processing and packaging by the food and beverage industry for decades, increasing evidence about the potential risks to human health and the environment have led to considerable pressure on manufacturers to consider safer alternatives.
- As a leader in food safety training, certification and consultancy, **AIB seeks to conduct research to understand how the food and beverage industry in the US is responding to calls to reduce or eradicate PFAS from their products, particularly from packaging.**
- A recent survey of food safety executives by AIB found that 30% felt PFAS was the most pressing issue for their company right now, closely followed by decision making of regulators (29%).
- **The aim is to use this research to raise awareness of the key issues that food and beverage companies ought to consider in reducing the use of PFAS and to showcase some good practice case studies of how some trailblazer companies in the industry have addressed the challenge.**

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objectives

AIB requested research with food and beverage companies to raise awareness of the key issues for companies to consider in reducing the use of PFAS and to showcase some good practice case studies.

1. **Horizon Scan – Identify the drivers of change** within the food and beverage industry regarding PFAS and learn about current initiatives underway within companies. *Note: Horizon Scan findings have been shared in a separate report.*

2. Quantitative survey with Food and Beverage industry representatives to quantify the response to PFAS on a range of issues including strategy, supply chain management, regulation, and communication.

3. Qualitative interviews to generate case studies of companies in the industry, drawing out lessons learned, and key actions undertaken that will be useful to others in the industry addressing his challenge.

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quantitative survey

methodology	15-minute quantitative survey using an online panel
markets	USA only
dates	December 8 –21, 2023
language	English only
criteria	Senior Executives & operations/manufacturing leaders Working in the food and beverage manufacturing/packaging industry
sample size	n=208 total respondents *(respondents could select multiple verticals)*:

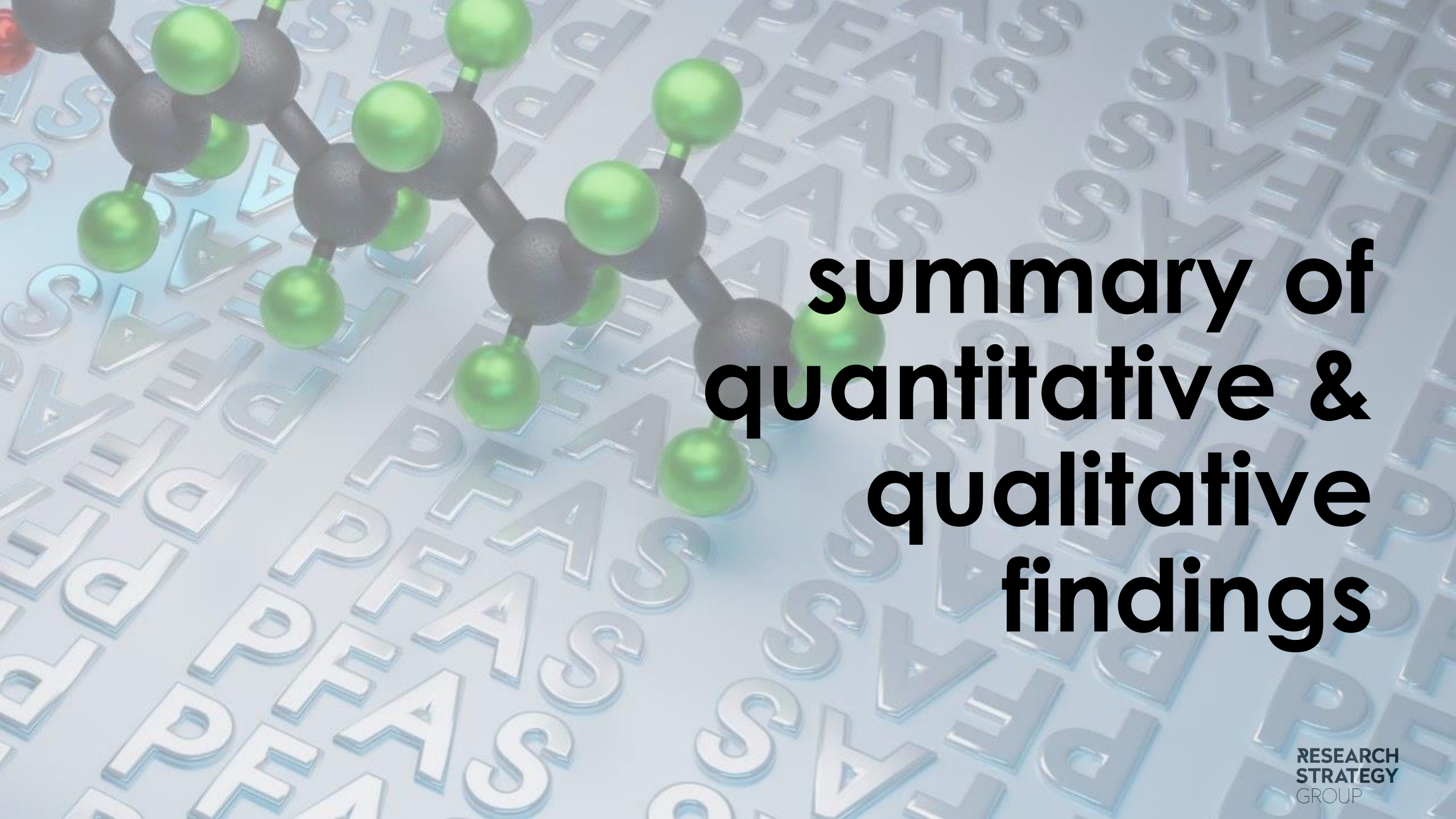
	# of respondents
Food or beverage packaging	105
Processed Food Manufacturing	74
Meat and Poultry Processing	60
Beverage Production	49
Dairy and Cheese Manufacturing	41
Health, Organic or Natural Foods	33
Grain and Cereal Processing	33
Confectionery	30
Baking	24

= higher score

= lower score

qualitative interviews

what	Sixteen (16) 60-minute online video interviews (via discuss.io platform).
who	Senior Executives & operations/manufacturing leaders Working in the food and beverage manufacturing/packaging industry
where	US only
language	English only



summary of quantitative & qualitative findings

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project summary

- The issue of **PFAS in food & beverage safety** is new for both regulators and the industry, with much **uncertainty** and **ambiguity.** The industry **lacks clarity and certainty**, especially when it comes to the future of PFAS.
- A survey of the industry revealed that issues such as rising costs, labor shortages, and **increased scrutiny on chemical contaminants like PFAS** pose major challenges.
- The main challenges identified by companies regarding PFAS are **finding suitable alternatives and their cost,** as well as **detecting/quantifying PFAS.**
- **87%** have conducted **testing** and **two-thirds** have **confirmed the presence** of PFAS. **74%** have **specific goals/targets** in place, including **reduction and elimination** while **79%** are **monitoring PFAS.** However, only **22%** of respondents feel their company is **very prepared** to deal with issues/concerns in the industry related to PFAS. **The majority see opportunity for doing more.**
- The qualitative research uncovered that **what companies self-report does not always correlate with their actual knowledge and preparedness** regarding PFAS issues and regulations.
- Interviews surfaced **four archetypal ways** organizations **think and deal** with PFAS, each with different **strengths and advantages** relative to each other, as well as different **needs** that **AIB** could assist them with.

quantitative findings

top issues in the food & beverage industry

- **Increased scrutiny on chemical contaminants like PFAS, as well as rising costs** and **food safety culture** are reported as the top issues facing the industry as a whole.
- Additionally, **labor shortages** come to the top as an issue companies in the industry report they are facing.

challenges related to PFAS

- **Cost of suitable alternatives, detecting/quantifying PFAS in food products, and increased demand for sustainable packaging** are the top challenges the industry is facing to address PFAS.
- A **lack of suitable alternatives** is also mentioned as a top challenge for companies.

quantitative findings (cont'd)

policies, goals & targets

- **Two-thirds have confirmed there are PFAS** in the packaging, products, or processes produced/conducted by their company.
- **87% have conducted testing** to confirm whether there are PFAS in their packaging, products or processes (68% in the past year).
    - PFAS are most likely to have been found in **food packaging materials, food ingredients, food processing additives, and water sources used in production.**
    - **Using alternative materials** is the most common plan in place to wean off food packaging that contains PFAS.
- Of the companies that have confirmed the presence of PFAS, **75% claim to inform customers about the presence of PFAS.**
    - 73% inform customers about the presence of PFAS on their packaging and 63% use the company website.

quantitative findings (cont'd)

policies, goals & targets (cont'd)

- 79% of companies report having policies in place to **monitor PFAS in their packaging/products/processes,** while **74% report having specific goals/targets** in place.
- 74% of companies report specific goals or **targets related to PFAS reduction**.
- Using **alternative PFAS-free materials, planning to completely eliminate PFAS, and regulation compliance** are the top goals/targets mentioned related to PFAS reduction.
- The most common voluntary changes include **simply staying informed and complying, ensuring raw materials are PFAS-free, and training employees about PFAS risks.**
- Only 22% of respondents feel their company is **very prepared to deal with issues/concerns in the industry related to PFAS.**
- The **level of satisfaction with how companies have been dealing with PFAS** suggest there is room for improvement across areas such as company reputation, product safety/quality, training, customer communication, research, etc.

quantitative findings (cont'd)

regulatory

- **One-quarter report regulatory changes related to PFAS already impacting their company's processes and practices, while half expect changes to** have an impact within the next year.
- Almost **half of respondents report their company has been mandated to substitute PFAS with alternatives** – among this group of companies, 25% report **switching packaging/ingredients**, while the rest are **still transitioning and researching alternatives**.
- **Government websites and regulatory agencies** are the top source companies use for staying up to date with regulatory changes related to PFAS.
- **Monitoring/reporting requirements, FDA banning PFAS, and the EPA designating certain PFAS as hazardous substances** are the top regulatory changes companies are currently dealing with and anticipate they will be dealing with **additional PFAS use restrictions** and **mandatory disclosure of intentionally added PFAS** in the near future.
- Only **one-third of respondents report their company is 'very prepared'** to deal with state or federal regulations related to PFAS.

qualitative findings

- The quantitative findings are based on self-reported results of preparedness regarding PFAS issues and regulations, however, in digging deeper, the qualitative interviews uncovered that **what companies self-report does not always correlate with their actual knowledge and preparedness** regarding PFAS issues and regulations.
- Our in-depth interviews uncovered **four archetypal ways** organizations **think and deal** with PFAS, based on a combination of different attributes such as their philosophy and motivation but also influenced by their size and maturity:
    1. Healthy, sustainable & naïve
    2. Bare minimum regulation followers
    3. Well organized and methodical
    4. Sophisticated and money-backed
- These archetypes have different **strengths and advantages** relative to each other, as well as different **needs** that **AIB** could assist them with covering four key areas:
    - Education
    - Training
    - Testing
    - Regulations

organization archetypes

healthy, sustainable and naive

bare minimum regulation followers

well-organized & methodical

sophisticated & money-backed

low levels of knowledge and preparation	medium levels of knowledge and preparation	medium levels of knowledge high levels of preparation	high levels of knowledge and preparation
medium & high confidence	**high confidence**	**medium & high confidence**	**medium confidence**
Smaller & entrepreneurial, these organizations focus on producing food that is healthy for consumers while minimizing their environmental impact. Assume their natural, organic products are also PFAS-free	Small local & regional processors that are simply running a highly regulated business. Used to complying with ever-changing regulations	Medium-sized companies that have very well-developed organizational tools and strategies. They are very open, collaborative and systematic	Larger national or international corporations that have a lot of resources at their disposal but also much costlier sanctions and responsibilities

healthy, sustainable and naive

NEEDS

EDUCATION Scientific understanding regulatory requirements

TRAINING How to develop strategies and processes
- For regulatory requirements
- Discovery of PFAS in their processes

TESTING Access to
Help in addressing positive results

REGULATIONS Education and Training

bare minimum regulation followers

NEEDS

EDUCATION Greater scientific understanding

TRAINING Help staying up to date with changing regulations

TESTING Reduced turnaround times
Lower Costs

REGULATIONS Phasing, allowing time to adapt
Grants and subsidies to help make changes required to comply with upcoming regulations

well-organized and methodical

NEEDS

EDUCATION More in-depth scientific understanding to proactively plan for future regulation

TRAINING --

TESTING Assistance
- Finding laboratories
- Costs

REGULATIONS Longer-term vision and clarity

sophisticated & money-backed

NEEDS

EDUCATION Consultants that can provide advice with certainty

TRAINING --

TESTING Better ways to test
- Less expensive
- More effective and precise

REGULATIONS Greater certainty
Clarity on government expectations
Concrete standards that can be realistically met.

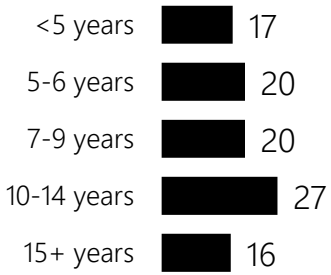
detailed quantitative findings

profile summary (n=208)

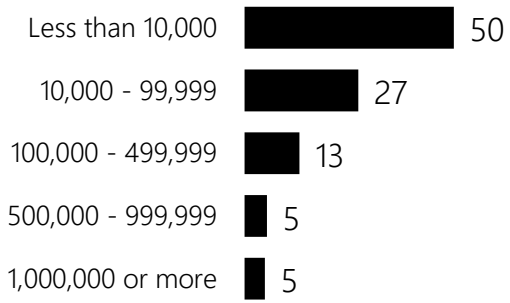
51%
MALE

48%
FEMALE

years at company %

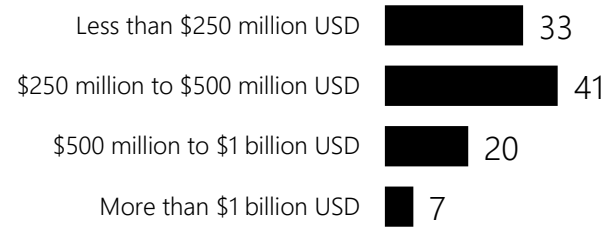


of employees %

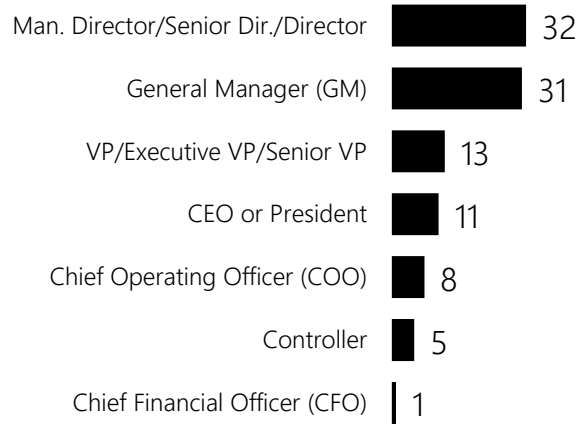


sector %

annual revenue %



role/title %



area of company %

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top issues in the food & beverage industry

PFAS is a top concern for the industry and companies in the food and beverage industry

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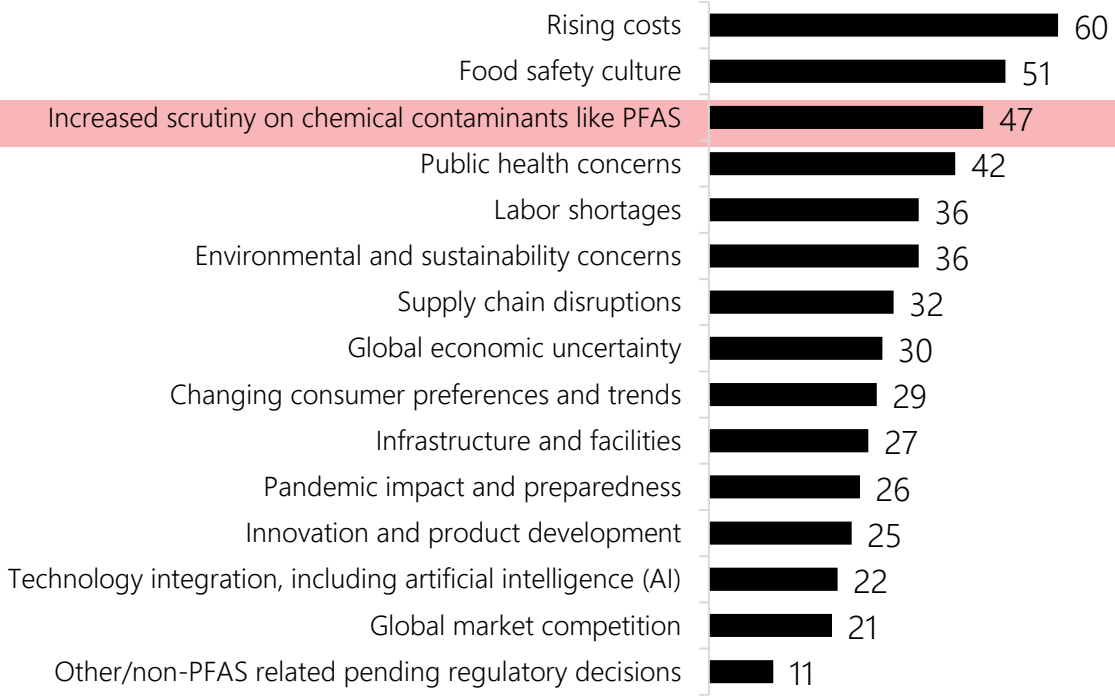
Rising costs, food safety culture, and increased scrutiny on chemical contaminants like PFAS are reported as the top issues facing the industry as a whole.

Rising costs are seen as the top issue among packaging companies, while rising costs, food safety culture and increased scrutiny on chemical contaminants like PFAS are perceived as the top issues for manufacturers.

top issues facing the industry (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Rising costs	60	**68**	52	**79**
Food safety culture	51	48	54	42
Increased scrutiny on chemical contaminants like PFAS	47	42	**52**	42
Public health concerns	42	**48**	37	42
Labor shortages	36	**46**	26	42
Environmental and sustainability concerns	36	34	38	**21**
Supply chain disruptions	32	34	29	38
Global economic uncertainty	30	29	31	25
Changing consumer preferences and trends	29	22	**36**	29
Infrastructure and facilities	27	31	23	**17**
Pandemic impact and preparedness	26	**32**	19	33
Innovation and product development	25	20	29	17
Technology integration, including artificial intelligence (AI)	22	25	19	**38**
Global market competition	21	21	21	25
Other/non-PFAS related pending regulatory decisions	11	12	10	13

Rising costs are by far the top concern for the baking industry.

*Caution: Low base size.

Q8. There are a number of issues facing the food and beverage manufacturing industry as a whole in the United States. Which of the following do you feel are the top issues facing the industry? Please select all that apply.

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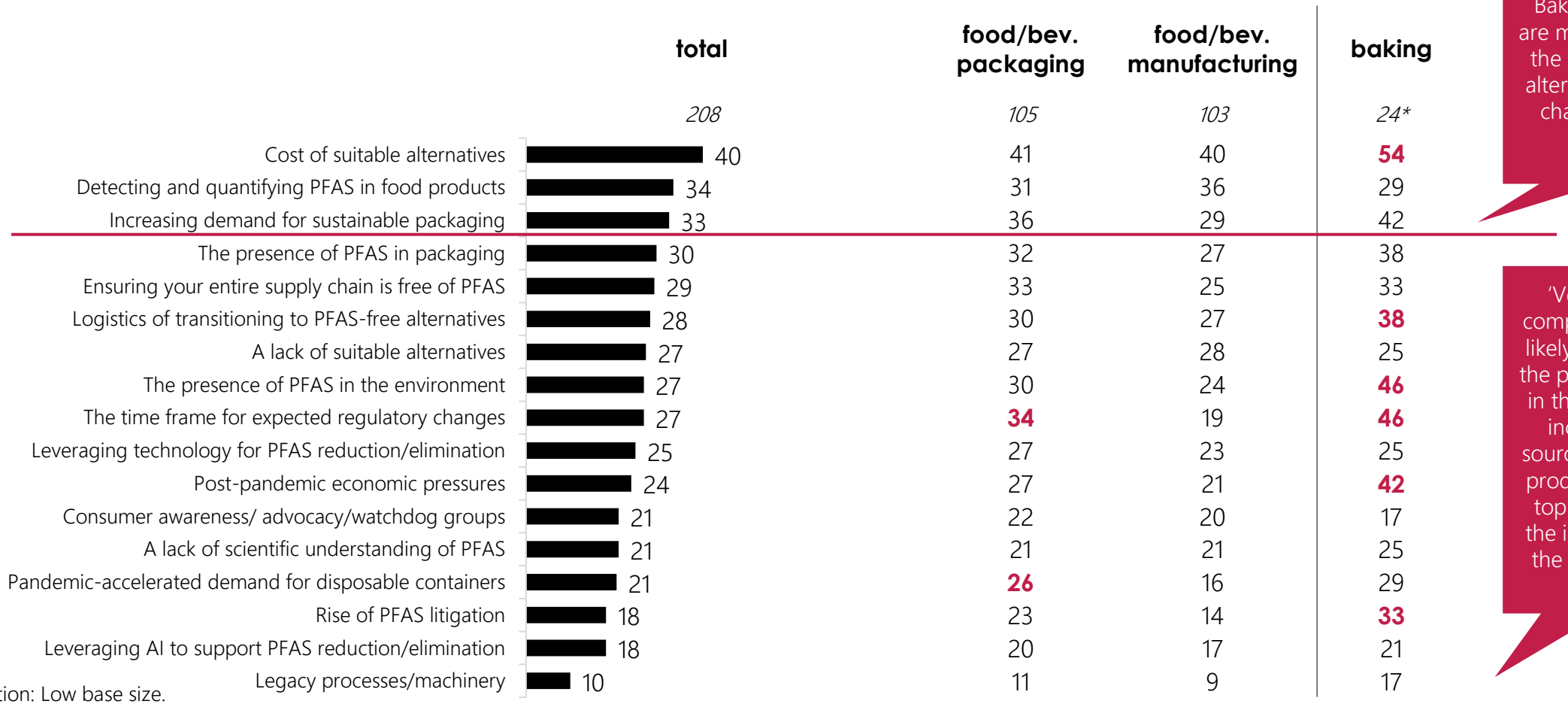
Cost of suitable alternatives, detecting/quantifying PFAS in food products, and increased demand for sustainable packaging are the top challenges the industry is facing to address PFAS.

top challenges for the industry to address PFAS (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Cost of suitable alternatives	40	41	40	**54**
Detecting and quantifying PFAS in food products	34	31	36	29
Increasing demand for sustainable packaging	33	36	29	42
The presence of PFAS in packaging	30	32	27	38
Ensuring your entire supply chain is free of PFAS	29	33	25	33
Logistics of transitioning to PFAS-free alternatives	28	30	27	**38**
A lack of suitable alternatives	27	27	28	25
The presence of PFAS in the environment	27	30	24	**46**
The time frame for expected regulatory changes	27	**34**	19	**46**
Leveraging technology for PFAS reduction/elimination	25	27	23	25
Post-pandemic economic pressures	24	27	21	**42**
Consumer awareness/ advocacy/watchdog groups	21	22	20	17
A lack of scientific understanding of PFAS	21	21	21	25
Pandemic-accelerated demand for disposable containers	21	**26**	16	29
Rise of PFAS litigation	18	23	14	**33**
Leveraging AI to support PFAS reduction/elimination	18	20	17	21
Legacy processes/machinery	10	11	9	17

Baking companies are more likely to see the cost of suitable alternatives as a top challenge for the industry.

'Very prepared' companies are more likely to believe that the presence of PFAS in the environment, including water sources used in food production will be a top challenge that the industry faces in the future (34% vs. 24%).

*Caution: Low base size.

Q16. There are a number of challenges that the food and beverage manufacturing industry is facing when it comes to addressing PFAS in the future. Which of the following do you feel are the top challenges for the industry in general? Please select all that apply.

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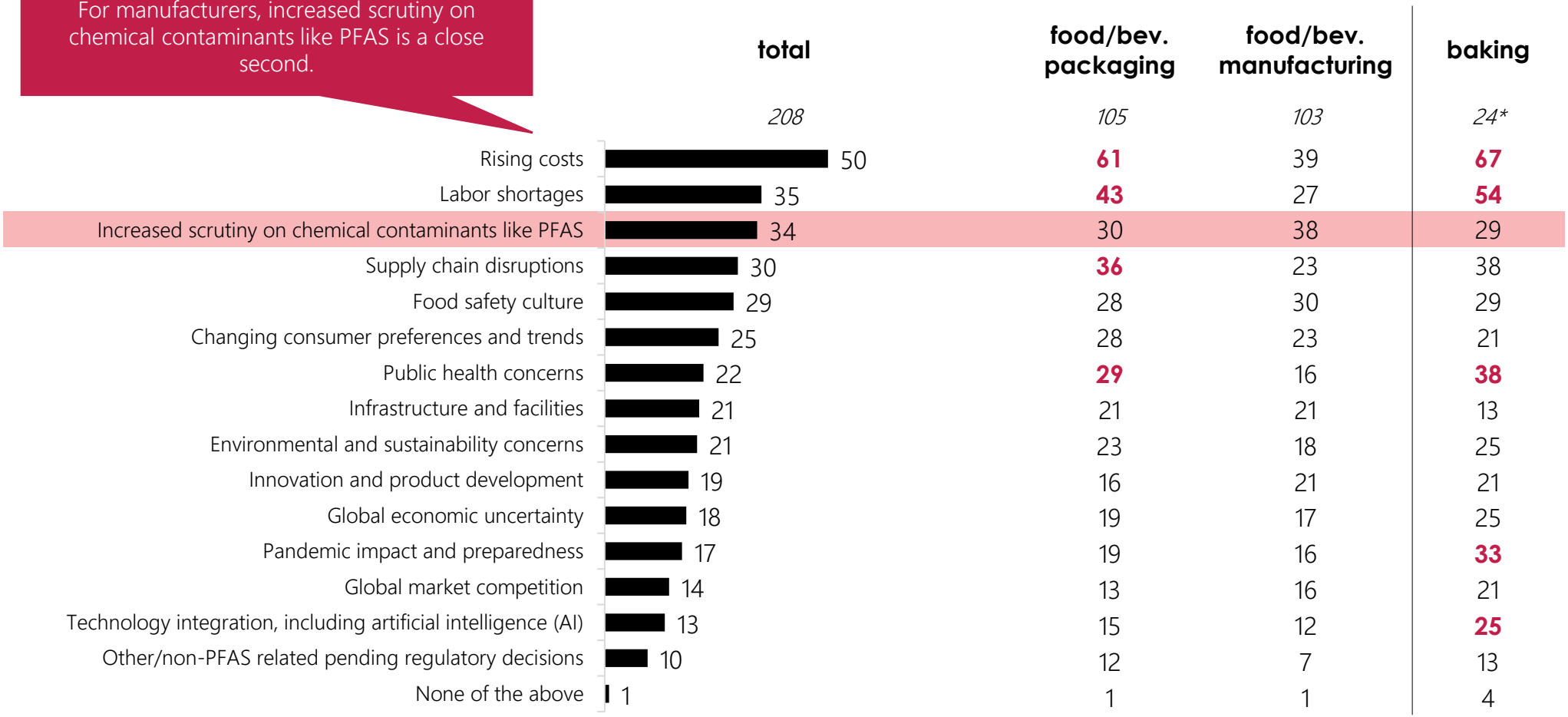
Rising costs is the top issue companies are facing, followed by labor shortages and increased scrutiny on chemical contaminants like PFAS.

Packaging companies are more likely to report rising costs as a top issue than manufacturers. For manufacturers, increased scrutiny on chemical contaminants like PFAS is a close second.

top issues facing the company (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Rising costs	50	**61**	39	**67**
Labor shortages	35	**43**	27	**54**
Increased scrutiny on chemical contaminants like PFAS	34	30	38	29
Supply chain disruptions	30	**36**	23	38
Food safety culture	29	28	30	29
Changing consumer preferences and trends	25	28	23	21
Public health concerns	22	**29**	16	**38**
Infrastructure and facilities	21	21	21	13
Environmental and sustainability concerns	21	23	18	25
Innovation and product development	19	16	21	21
Global economic uncertainty	18	19	17	25
Pandemic impact and preparedness	17	19	16	**33**
Global market competition	14	13	16	21
Technology integration, including artificial intelligence (AI)	13	15	12	**25**
Other/non-PFAS related pending regulatory decisions	10	12	7	13
None of the above	1	1	1	4

Rising costs are also the top issue baking companies are facing, followed by labor shortages. PFAS is perceived as less of an issue at 29%.

*Caution: Low base size.
Q9. And which of the following are the top issues your company is facing? Please select all that apply.

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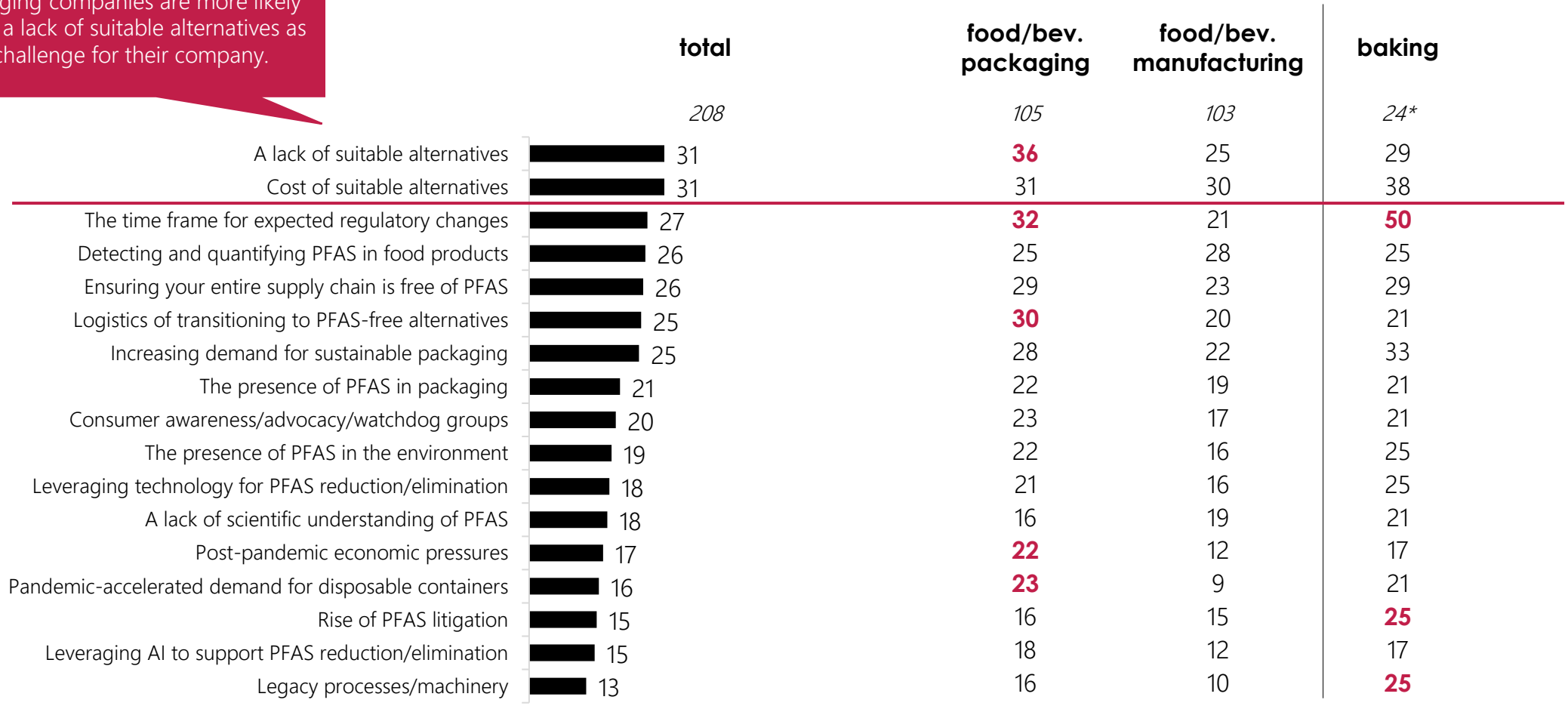
A lack of suitable alternatives and the cost of suitable alternatives are the top challenges that companies are facing when it comes to addressing PFAS in the future.

Packaging companies are more likely to see a lack of suitable alternatives as a challenge for their company.

top challenges for your company to address PFAS (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
A lack of suitable alternatives	31	**36**	25	29
Cost of suitable alternatives	31	31	30	38
The time frame for expected regulatory changes	27	**32**	21	**50**
Detecting and quantifying PFAS in food products	26	25	28	25
Ensuring your entire supply chain is free of PFAS	26	29	23	29
Logistics of transitioning to PFAS-free alternatives	25	**30**	20	21
Increasing demand for sustainable packaging	25	28	22	33
The presence of PFAS in packaging	21	22	19	21
Consumer awareness/advocacy/watchdog groups	20	23	17	21
The presence of PFAS in the environment	19	22	16	25
Leveraging technology for PFAS reduction/elimination	18	21	16	25
A lack of scientific understanding of PFAS	18	16	19	21
Post-pandemic economic pressures	17	**22**	12	17
Pandemic-accelerated demand for disposable containers	16	**23**	9	21
Rise of PFAS litigation	15	16	15	**25**
Leveraging AI to support PFAS reduction/elimination	15	18	12	17
Legacy processes/machinery	13	16	10	**25**

*Caution: Low base size.

Q17. And which of the following do you feel are the top challenges your company is facing when it comes to addressing PFAS in the future? Please select all that apply.

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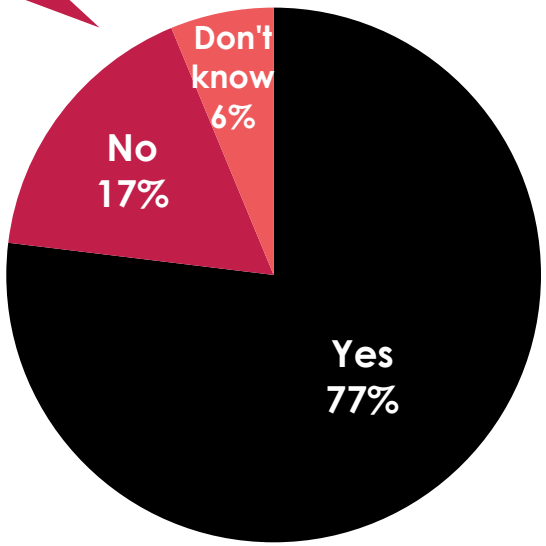
policies, goals & targets

Over three-quarters claim they had heard of PFAS before.

Respondents working at companies with revenue of less than $250 million were *less* likely to have heard of PFAS before today (68% vs. 81%).



heard of PFAS before today (%)

	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Yes	77	77	77	**67**
No	16	16	17	**29**
Don't know	7	7	6	4

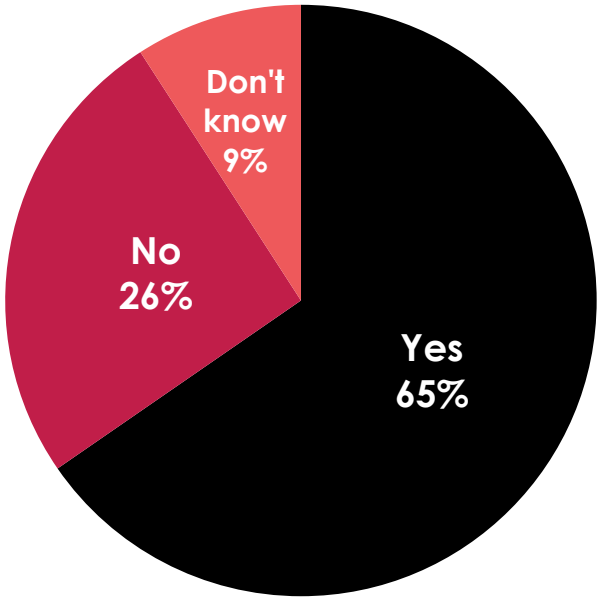
Respondents from baking companies report lower awareness of PFAS than other industries.

*Caution: Low base size.
Q10. Before today, had you heard of PFAS (per-and polyfluoroalkyl substances) or "forever chemicals"? Please select one.

Two-thirds have confirmed there are PFAS in their company's packaging, products, or processes

Two-thirds have confirmed there are PFAS in the packaging, products, or processes produced/conducted by their company.

confirmed PFAS in company (%)



	food/bev. packaging	food/bev. manufacturing	baking
	105	*103*	*24**
Yes	67	64	71
No	24	27	25
Don't know	10	9	4

Companies with revenue of less than $250 million are *less* likely to have confirmed there are PFAS in the packaging, products, or processes produced or conducted by their company (54% vs. 71%).

*Caution: Low base size.
Q26. To confirm, are there PFAS in the packaging, products or processes produced or conducted by your company? Please select one.

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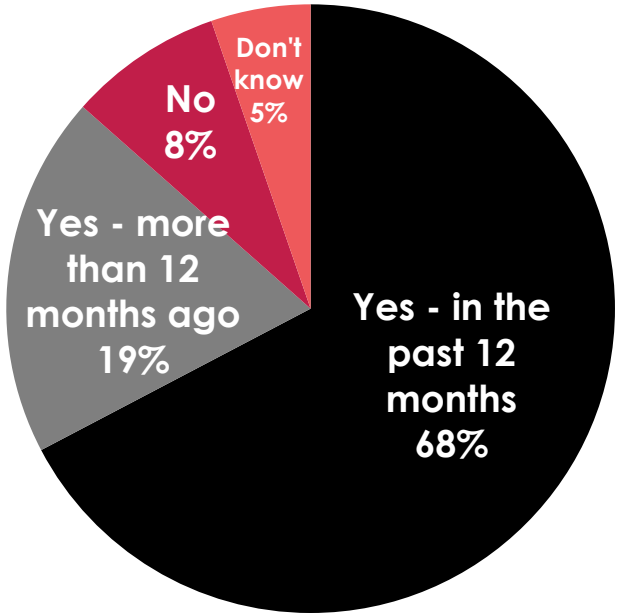
87% have conducted testing to confirm whether there are PFAS in their packaging, products or processes (68% in the past year).

conducted testing to confirm PFAS in company (%)



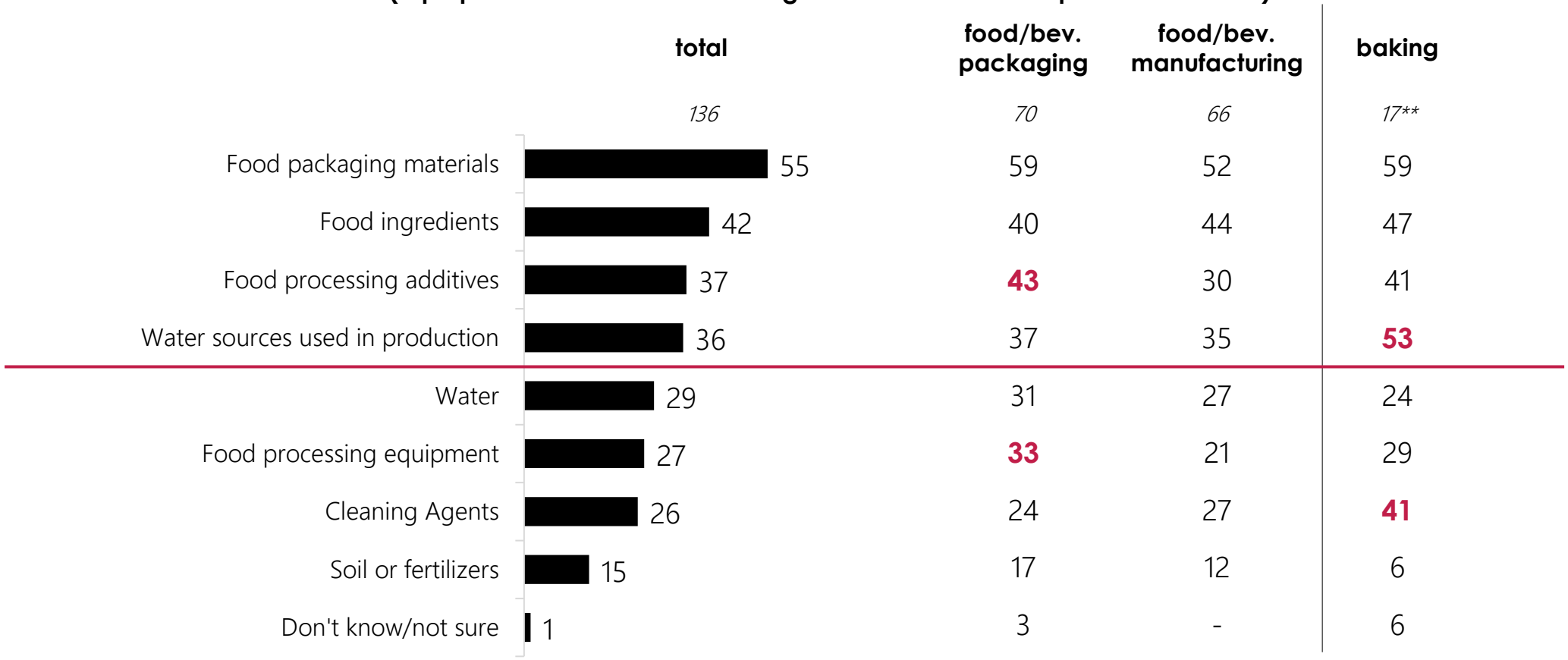
	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Yes – in P12M	68	68	67	63
Yes – more than 12M ago	20	20	18	21
No	6	6	11	13
Don't know	7	7	4	4

*Caution: Low base size.
Q27. Has your company conducted testing to confirm if there are PFAS in the packaging, products or processes produced or conducted by your company? Please select one.

PFAS are most likely to have been found in food packaging materials, food ingredients, food processing additives, and water sources used in production.

where PFAS have been found (%)

(top open-ended mentions among those who confirmed presence of PFAS)



**Caution: Very low base size.
Q28. Where have PFAS been found by your company? Please select all that apply.

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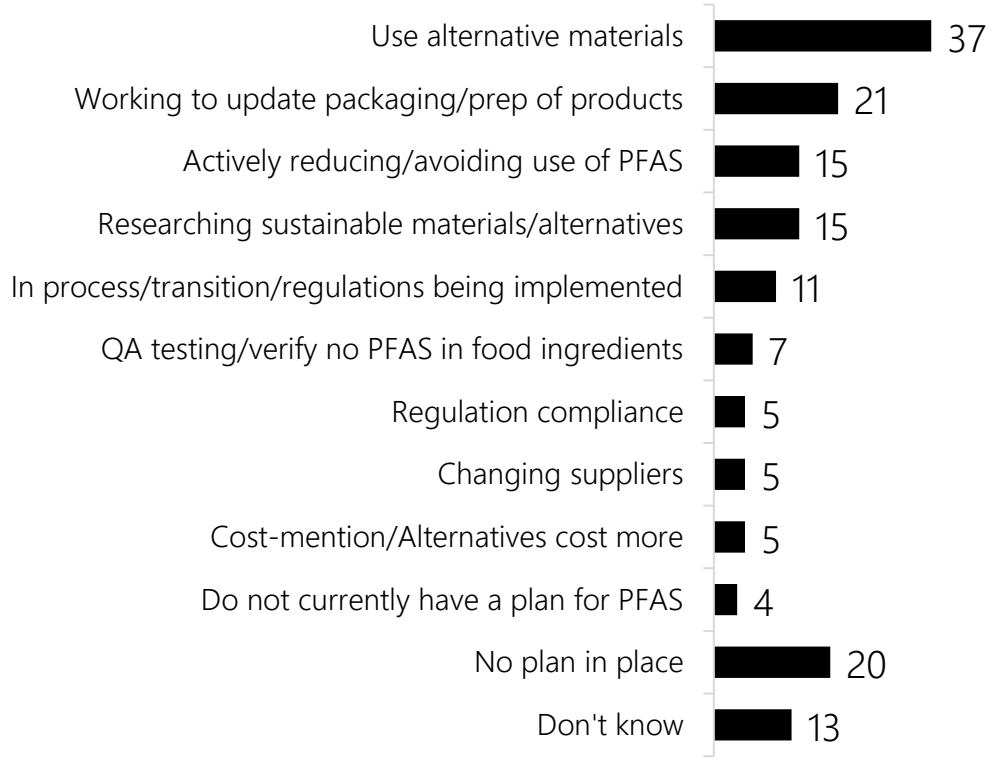
Using alternative materials is the most common plan in place to wean off food packaging that contains PFAS.

One-in-five report having no plan in place to wean off packaging that contains PFAS.

plans to wean off packaging that contains PFAS (%)

(among those who confirmed PFAS in packaging)



	total	food/bev. packaging	food/bev. manufacturing	baking
	75	*41*	*34*	*10***
Use alternative materials	37	**46**	26	**60**
Working to update packaging/prep of products	21	22	21	20
Actively reducing/avoiding use of PFAS	15	17	12	20
Researching sustainable materials/alternatives	15	10	**21**	10
In process/transition/regulations being implemented	11	15	6	10
QA testing/verify no PFAS in food ingredients	7	7	6	-
Regulation compliance	5	2	9	-
Changing suppliers	5	5	6	10
Cost-mention/Alternatives cost more	5	5	6	**20**
Do not currently have a plan for PFAS	4	5	3	10
No plan in place	20	22	18	20
Don't know	13	10	18	-

**Caution: Very low base size.

Q29. What plan does your company have in place, if any, to wean off food packaging that contains PFAS?

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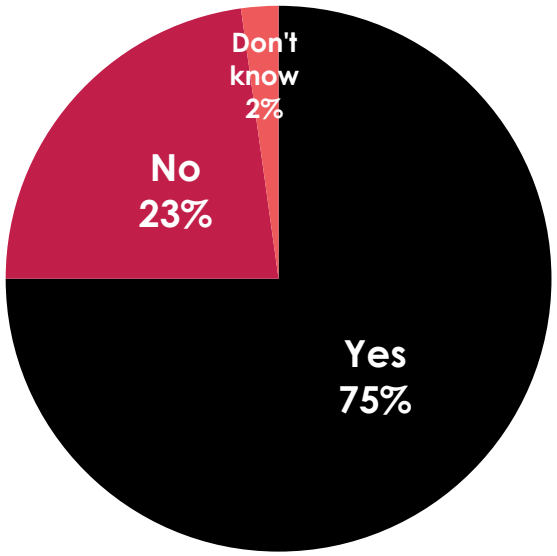
3-in-4 companies inform customers about the presence of PFAS in the packaging, products, or processes produced or conducted by their company.

inform customers about presence of PFAS (%)

(among those who confirmed presence of PFAS)



	total	food/bev. packaging	food/bev. manufacturing	baking
	136	*70*	*66*	*17***
Yes	73	77	71	
No	23	23	24	
Don't know	4	-	6	

Beverage Production (87%), Confectionery (86%) and those very prepared for regulations (85%) are most likely to inform their customers about the presence of PFAS.

**Caution: Very low base size.

Q30. Does your company inform customers about the presence of PFAS in the packaging, products or processes produced or conducted by your company? Please select one.

RESEARCH STRATEGY GROUP

Information on packaging is the most common way to inform customers about the presence of PFAS, followed by info on the company website.

Packaging companies are more likely to include info on packaging, while manufacturers are more likely to put info on the company website.

informing customers about PFAS presence (%)

(among those who inform customers about presence of PFAS)

**Caution: Very low base size.

Q31. How does your company inform customers about the presence of PFAS in the packaging, products or processes produced or conducted by your company? Please select all that apply.

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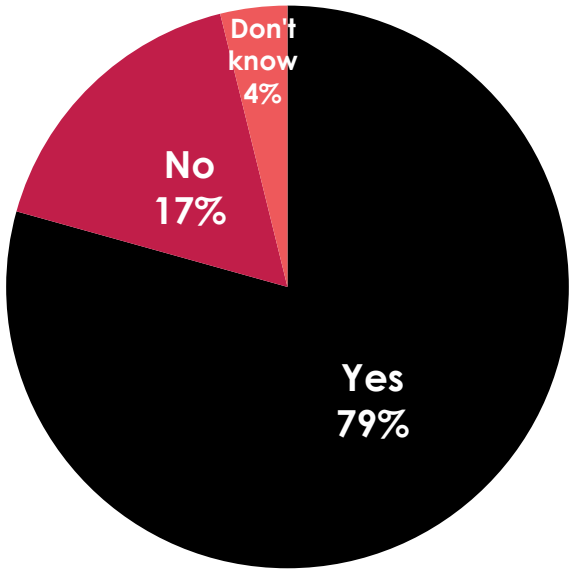
4-in-5 companies report having policies in place to monitor PFAS in their packaging/products/processes.

policies in place to monitor PFAS (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Yes	83	83	76	71
No	10	10	**23**	25
Don't know	7	7	1	4

Companies that feel *very* prepared for regulations are more likely to have policies in place to monitor PFAS (92% vs. 74%).

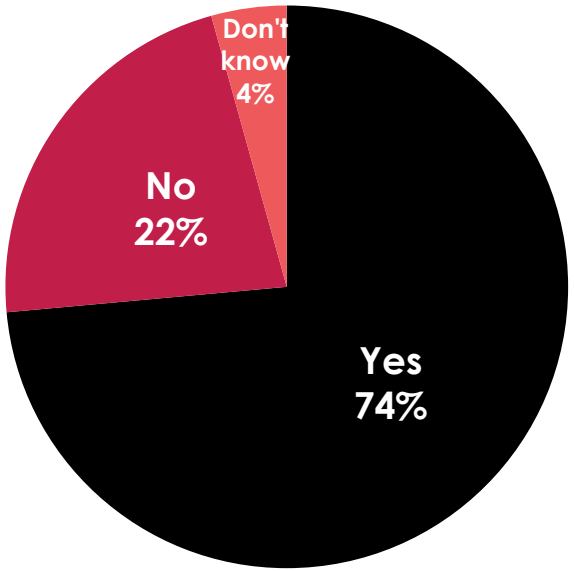
Companies with revenue of less than $250 million are *less* likely to have policies in place to monitor PFAS (69% vs. 84%).

*Caution: Low base size.
Q23. Does your company have policies in place to monitor PFAS in the packaging, products or processes produced or conducted by your company? Please select one.

RESEARCH STRATEGY GROUP

3-in-4 companies report specific goals or targets related to PFAS reduction.

specific goals or targets related to PFAS reduction (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Yes	76	71	75	
No	18	26	25	
Don't know	6	3	-	

Companies that feel *very* prepared for regulations are more likely to have specific goals/targets (88% vs. 67%).

Companies with revenue of less than $250 million were *less* likely to have specific goals or targets related to PFAS reduction in place (63% vs. 79%).

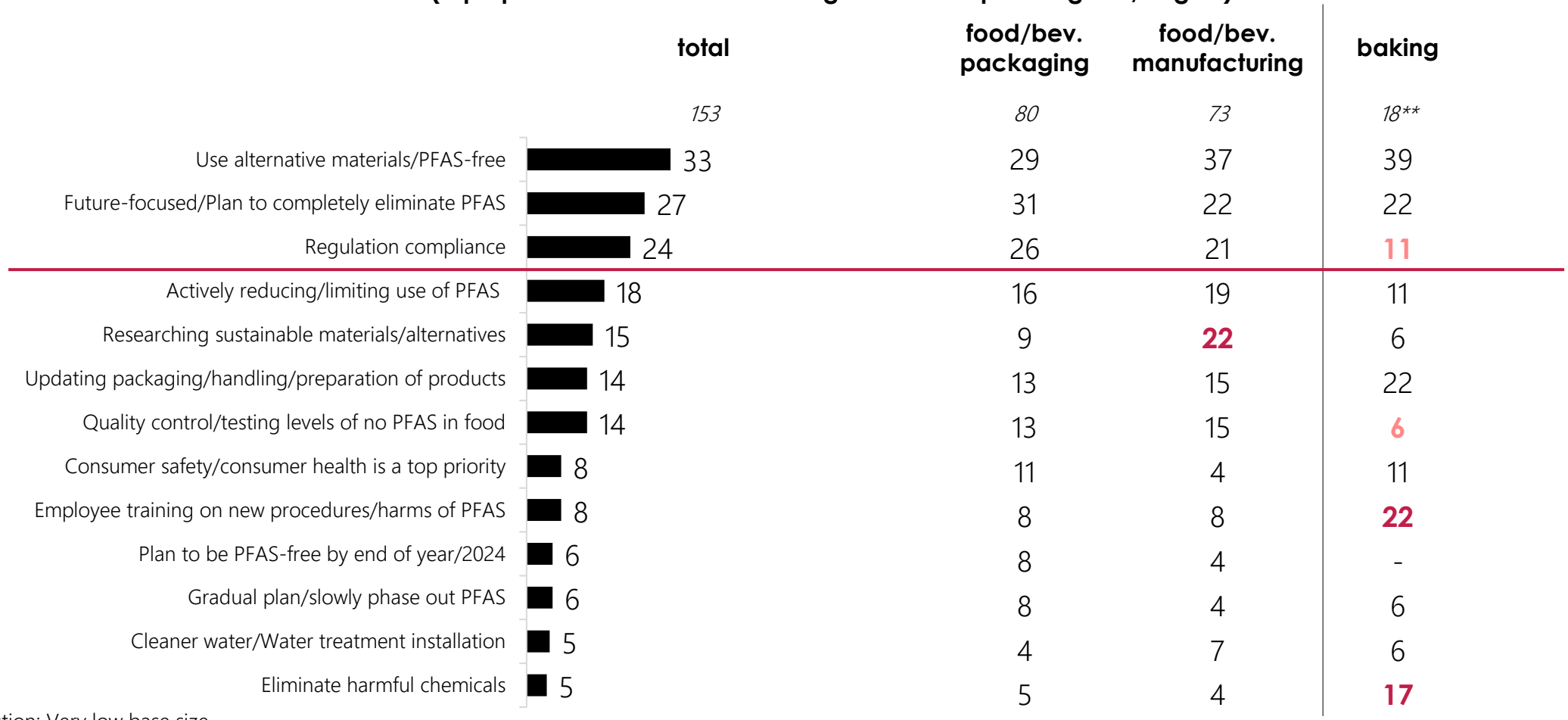
*Caution: Low base size.
Q24. Does your company have specific goals or targets related to PFAS reduction? Please select one.

RESEARCH STRATEGY GROUP

Using alternative PFAS-free materials, planning to completely eliminate PFAS, and regulation compliance are the top goals/targets mentioned related to PFAS reduction.

specific goals/targets related to PFAS reduction (%)

(top open-ended mentions among those with specific goals/targets)



	total	food/bev. packaging	food/bev. manufacturing	baking
	153	*80*	*73*	*18***
Use alternative materials/PFAS-free	33	29	37	39
Future-focused/Plan to completely eliminate PFAS	27	31	22	22
Regulation compliance	24	26	21	11
Actively reducing/limiting use of PFAS	18	16	19	11
Researching sustainable materials/alternatives	15	9	22	6
Updating packaging/handling/preparation of products	14	13	15	22
Quality control/testing levels of no PFAS in food	14	13	15	6
Consumer safety/consumer health is a top priority	8	11	4	11
Employee training on new procedures/harms of PFAS	8	8	8	22
Plan to be PFAS-free by end of year/2024	6	8	4	-
Gradual plan/slowly phase out PFAS	6	8	4	6
Cleaner water/Water treatment installation	5	4	7	6
Eliminate harmful chemicals	5	5	4	17

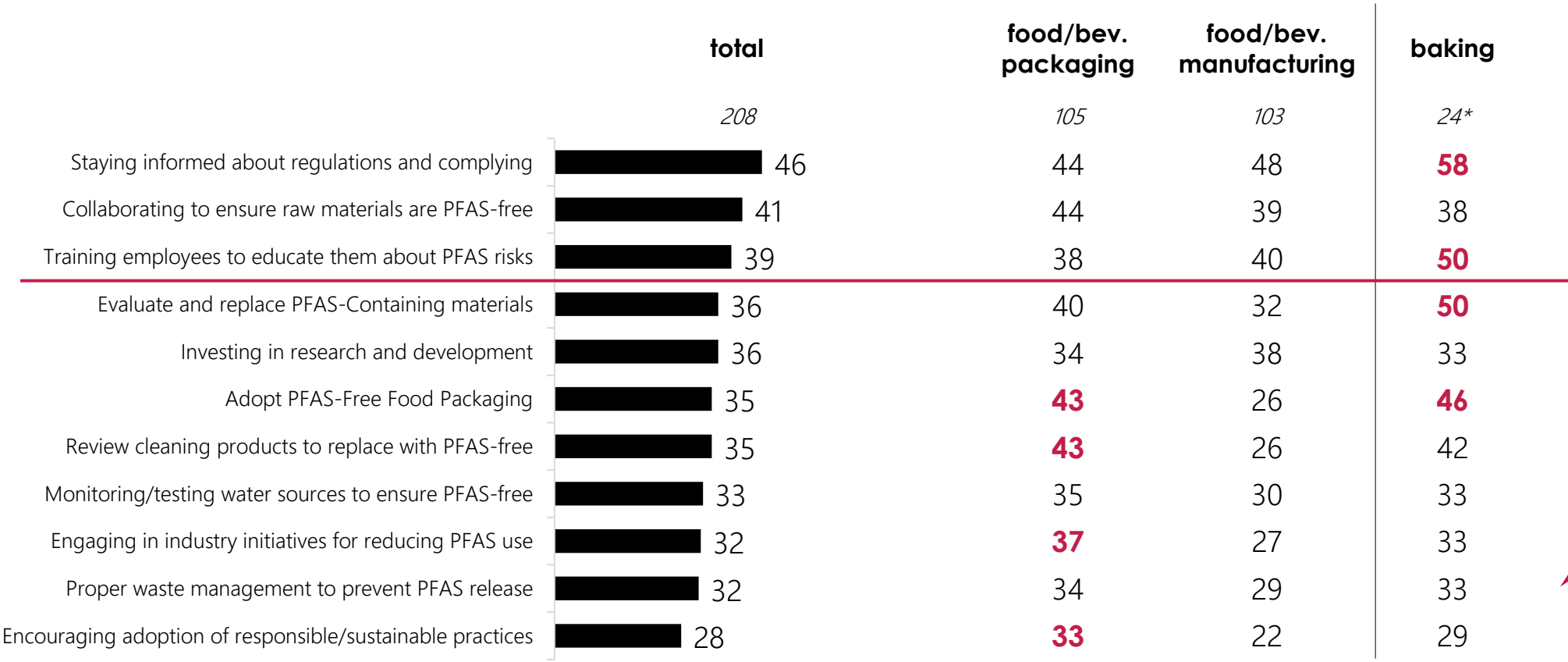
**Caution: Very low base size.

Q25. What are the specific goals or targets related to PFAS reduction that your company currently has? Please be as detailed as possible.

RESEARCH STRATEGY GROUP

The most common voluntary changes include simply staying informed and complying, ensuring raw materials are PFAS-free, and training employees about PFAS risks.

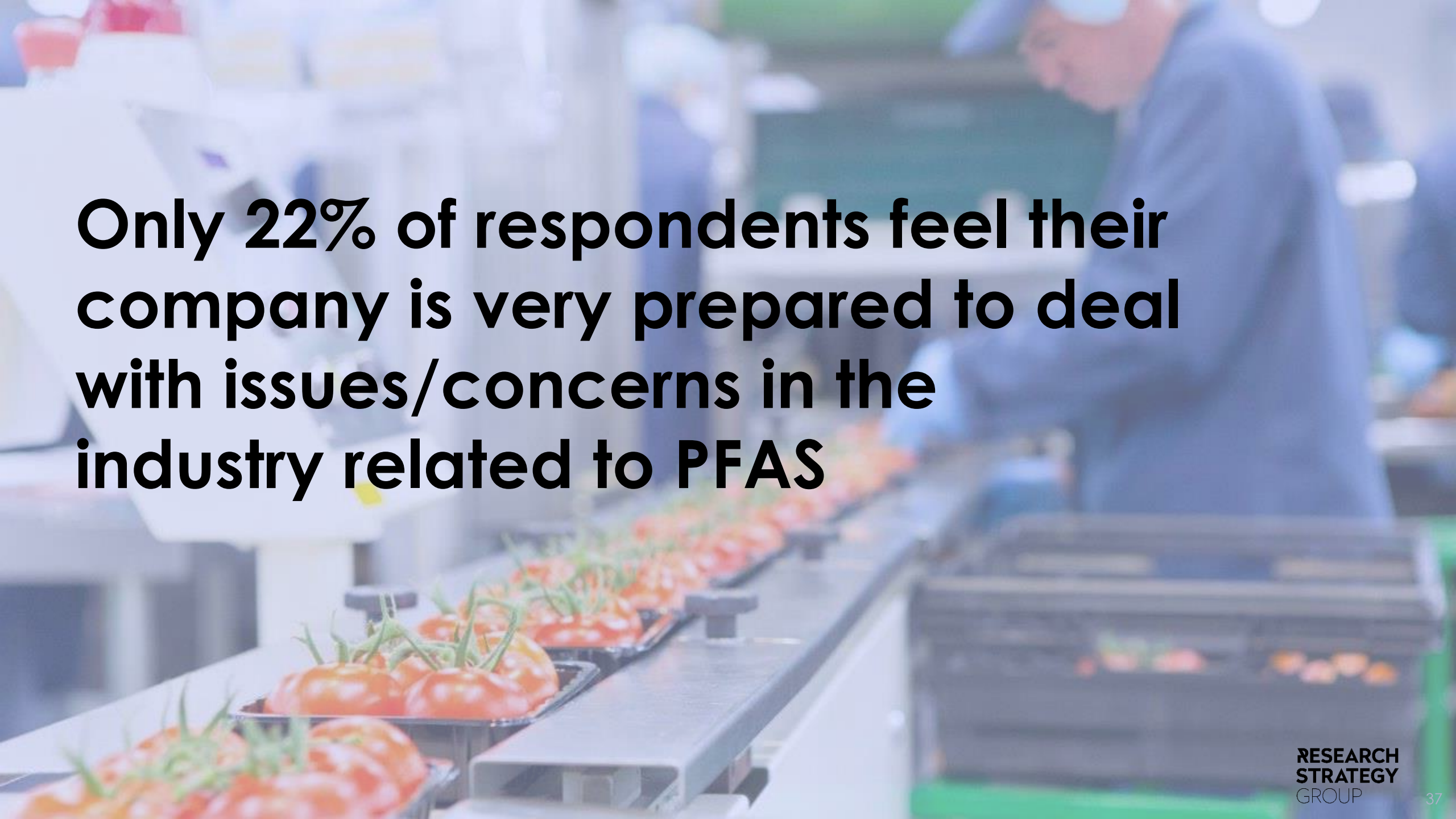
voluntary changes to reduce/remove PFAS (%)



Very prepared companies are more likely to be collaborating with suppliers (52% vs. 37%) and training employees (47% vs. 35%). They are also adopting PFAS-free food packaging and reviewing cleaning products at higher rates (41% vs. 32% for both).

*Caution: Low base size.
Q22. What voluntary changes are your company making to reduce/remove PFAS? Please select all that apply.

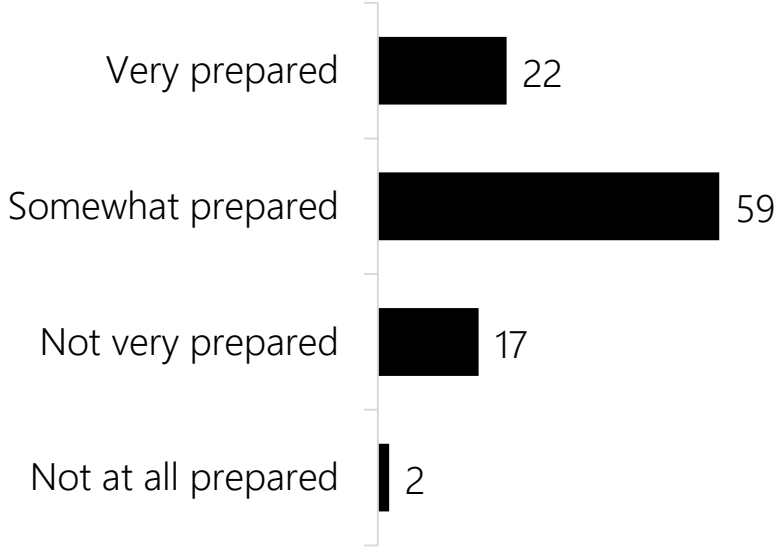
RESEARCH STRATEGY GROUP



Only 22% of respondents feel their company is very prepared to deal with issues/concerns in the industry related to PFAS

Only 22% of respondents feel their company is 'very prepared' to deal with issues/concerns in the industry related to PFAS.

company preparedness relating to PFAS issues/concerns (%)



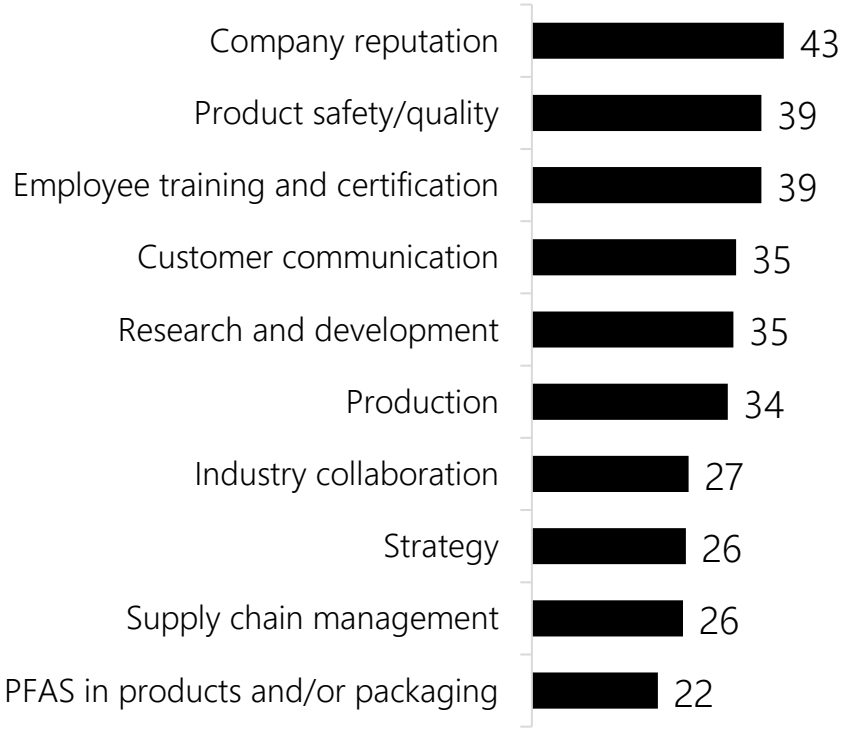
	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Very prepared	22	21	23	29
Somewhat prepared	59	**64**	53	63
Not very prepared	17	14	20	8
Not at all prepared	2	1	3	-

*Caution: Low base size.
Q18. How well prepared do you feel your company is to deal with issues/concerns in the industry related to PFAS? Please select one.

RESEARCH STRATEGY GROUP

The level of satisfaction with how companies have been dealing with PFAS in these areas is varied.

satisfaction with how your company has been dealing with PFAS
(% very satisfied)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Company reputation	43	41	46	38
Product safety/quality	39	39	40	33
Employee training and certification	39	44	35	42
Customer communication	35	36	34	42
Research and development	35	36	33	33
Production	34	36	31	25
Industry collaboration	27	30	24	25
Strategy	26	28	25	25
Supply chain management	26	29	23	21
Substituting PFAS in products and/or packaging	22	16	**27**	13

Companies that feel very prepared are more likely to be very satisfied with how their company has been dealing with PFAS across all areas.

*Caution: Low base size.
Q19. And how satisfied are you with how your company has been dealing with PFAS for each of the following? Please select a response for each.

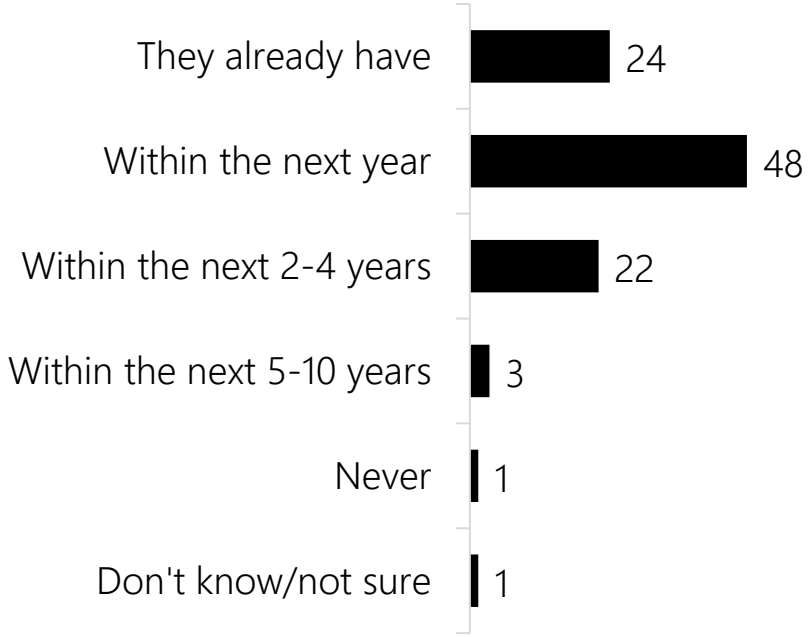
RESEARCH STRATEGY GROUP

regulatory

One-quarter report regulatory changes related to PFAS already impacting their company's processes and practices

One-quarter report regulatory changes related to PFAS already impacting their company's processes and practices, while half expect changes to have an impact within the next year.

when regulatory changes will have an impact (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
They already have	24	25	23	25
Within the next year	48	50	45	**33**
Within the next 2-4 years	22	20	24	29
Within the next 5-10 years	3	3	4	8
Never	1	1	2	-
Don't know/not sure	1	1	2	4

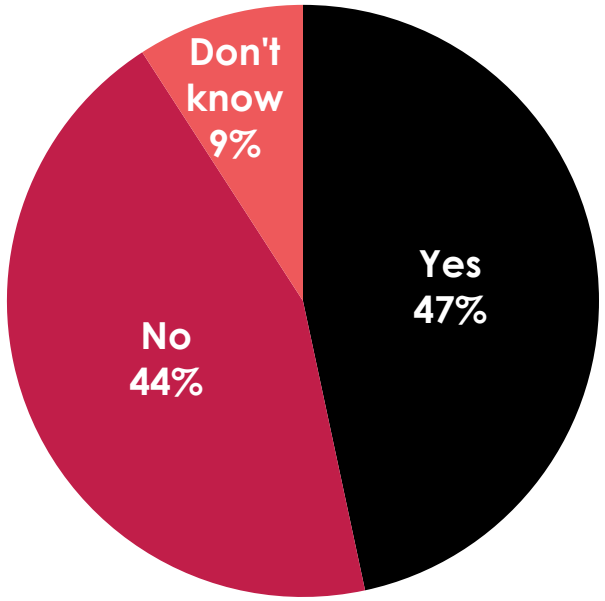
A higher proportion of baking companies think they have more time before regulatory changes impact their company.

*Caution: Low base size.
Q15. When do you think regulatory changes related to PFAS will impact your company's processes and practices? Please select one.

RESEARCH STRATEGY GROUP

Almost half of respondents report their company has been mandated to substitute PFAS with alternatives, with those in packaging being more likely than those in manufacturing.

mandated to substitute PFAS with alternatives (%)



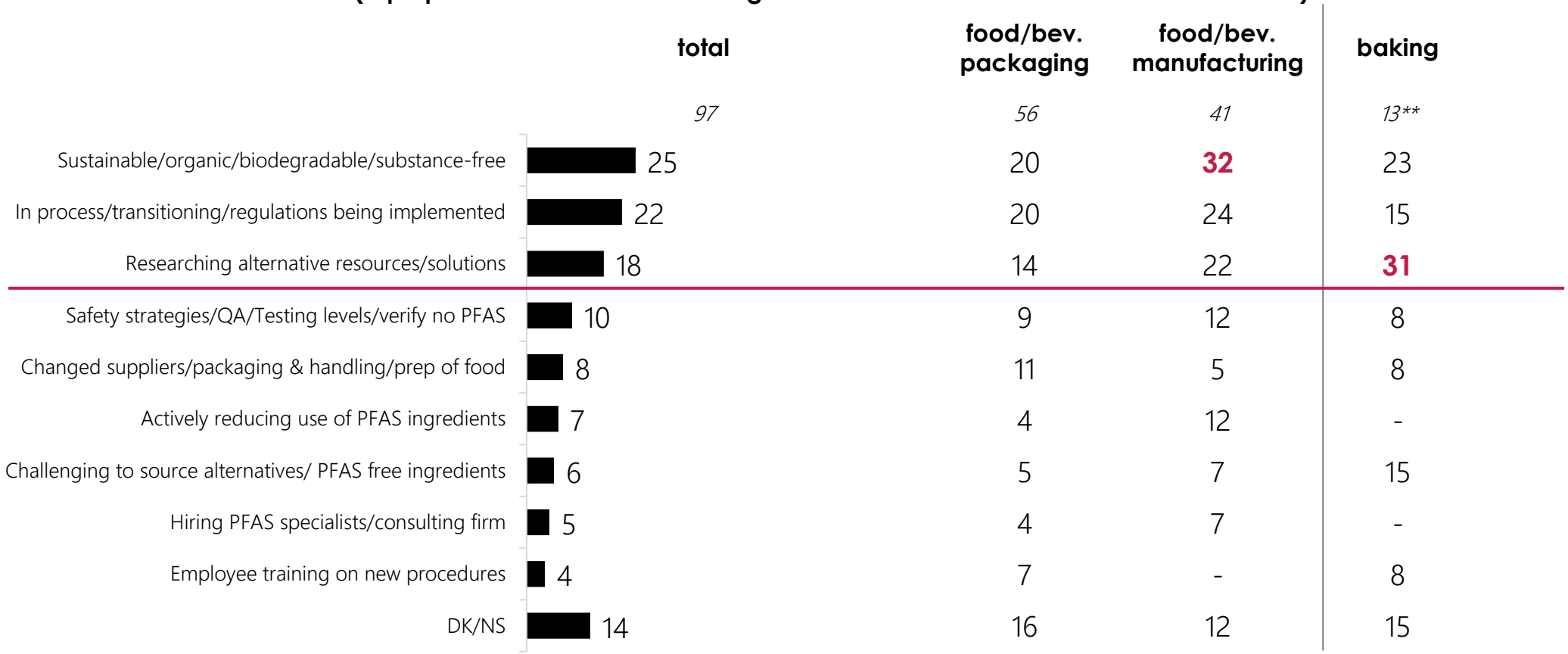
	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Yes		**53**	40	54
No		33	**55**	42
Don't know		13	5	4

*Caution: Low base size.
Q20. To confirm, has your company been mandated to substitute PFAS with alternatives? Please select one.

Among those mandated to substitute, one-quarter report switching packaging/ingredients, however the majority are still transitioning and researching alternatives.

changes since mandate to substitute PFAS with alternatives (%)

(top open-ended mentions among those who have been mandated to substitute)



	total	food/bev. packaging	food/bev. manufacturing	baking
	97	*56*	*41*	*13***
Sustainable/organic/biodegradable/substance-free	25	20	**32**	23
In process/transitioning/regulations being implemented	22	20	24	15
Researching alternative resources/solutions	18	14	22	**31**
Safety strategies/QA/Testing levels/verify no PFAS	10	9	12	8
Changed suppliers/packaging & handling/prep of food	8	11	5	8
Actively reducing use of PFAS ingredients	7	4	12	-
Challenging to source alternatives/ PFAS free ingredients	6	5	7	15
Hiring PFAS specialists/consulting firm	5	4	7	-
Employee training on new procedures	4	7	-	8
DK/NS	14	16	12	15

**Caution: Very low base size.

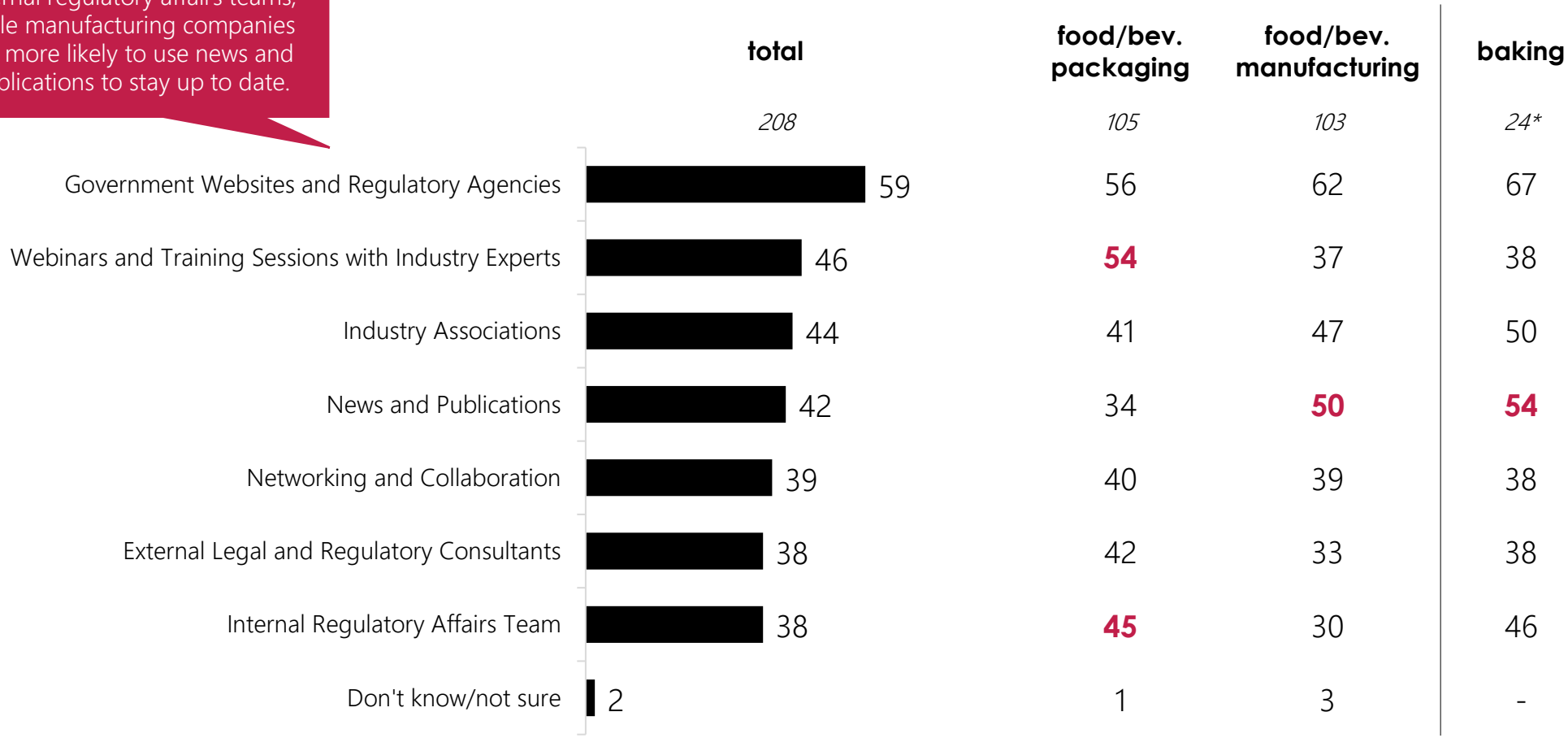
Q21. What changes has your company implemented since the mandate to substitute PFAS with alternatives? Please be as detailed as possible.

RESEARCH STRATEGY GROUP

Government websites and regulatory agencies are the top source companies use for staying up to date with regulatory changes related to PFAS.

Packaging companies are more likely to use industry experts and internal regulatory affairs teams, while manufacturing companies are more likely to use news and publications to stay up to date.

staying up to date with PFAS related regulatory changes (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Government Websites and Regulatory Agencies	59	56	62	67
Webinars and Training Sessions with Industry Experts	46	**54**	37	38
Industry Associations	44	41	47	50
News and Publications	42	34	**50**	**54**
Networking and Collaboration	39	40	39	38
External Legal and Regulatory Consultants	38	42	33	38
Internal Regulatory Affairs Team	38	**45**	30	46
Don't know/not sure	2	1	3	-

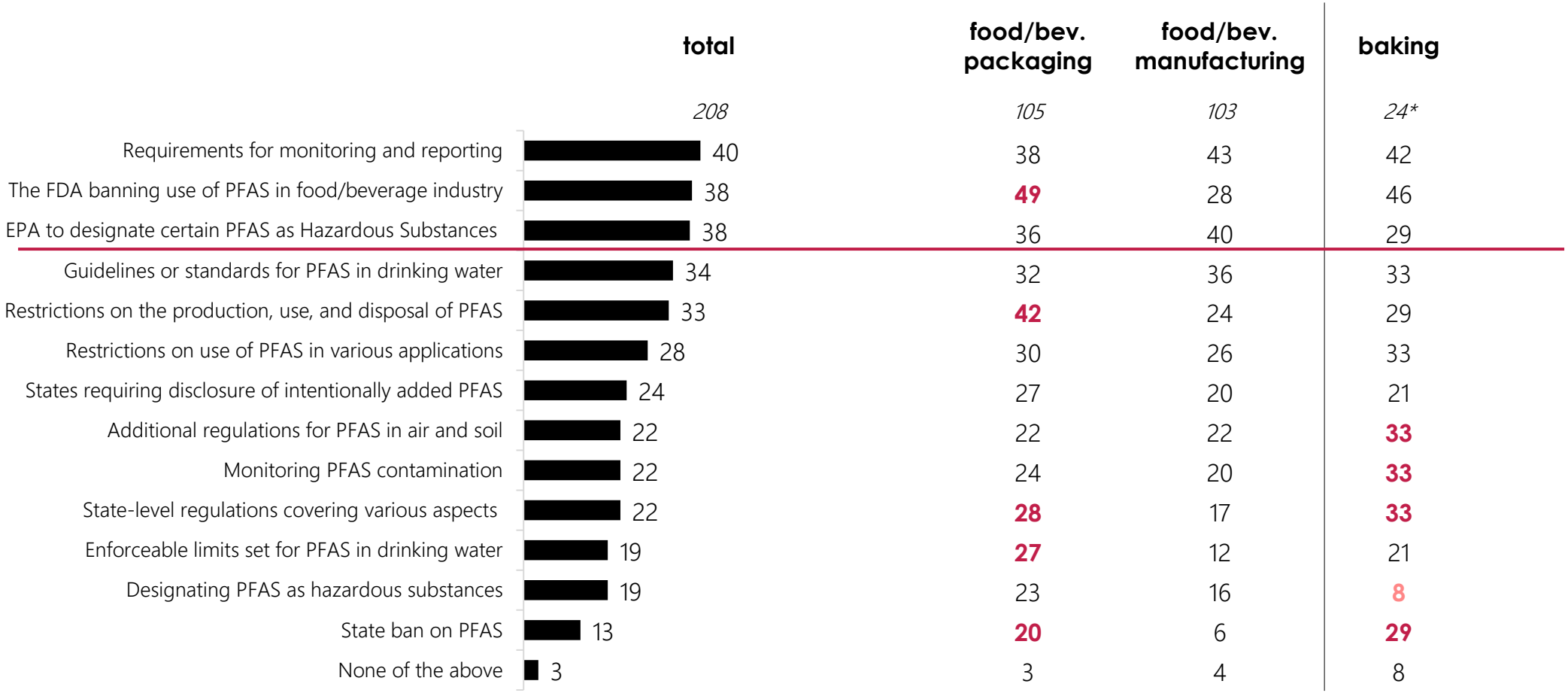
Companies with $250 million+ annual revenue and those very prepared for regulations are more likely to say that their company stays up to date with external legal and regulatory consultants and internal regulatory affairs team.

*Caution: Low base size.
Q12. How does your company stay up to date with regulatory changes related to PFAS? Please select all that apply.

RESEARCH STRATEGY GROUP

Monitoring/reporting requirements, FDA banning PFAS, and the EPA designating certain PFAS as hazardous substances are the top regulatory changes companies are currently dealing with.

regulatory changes related to PFAS company is dealing with (%)

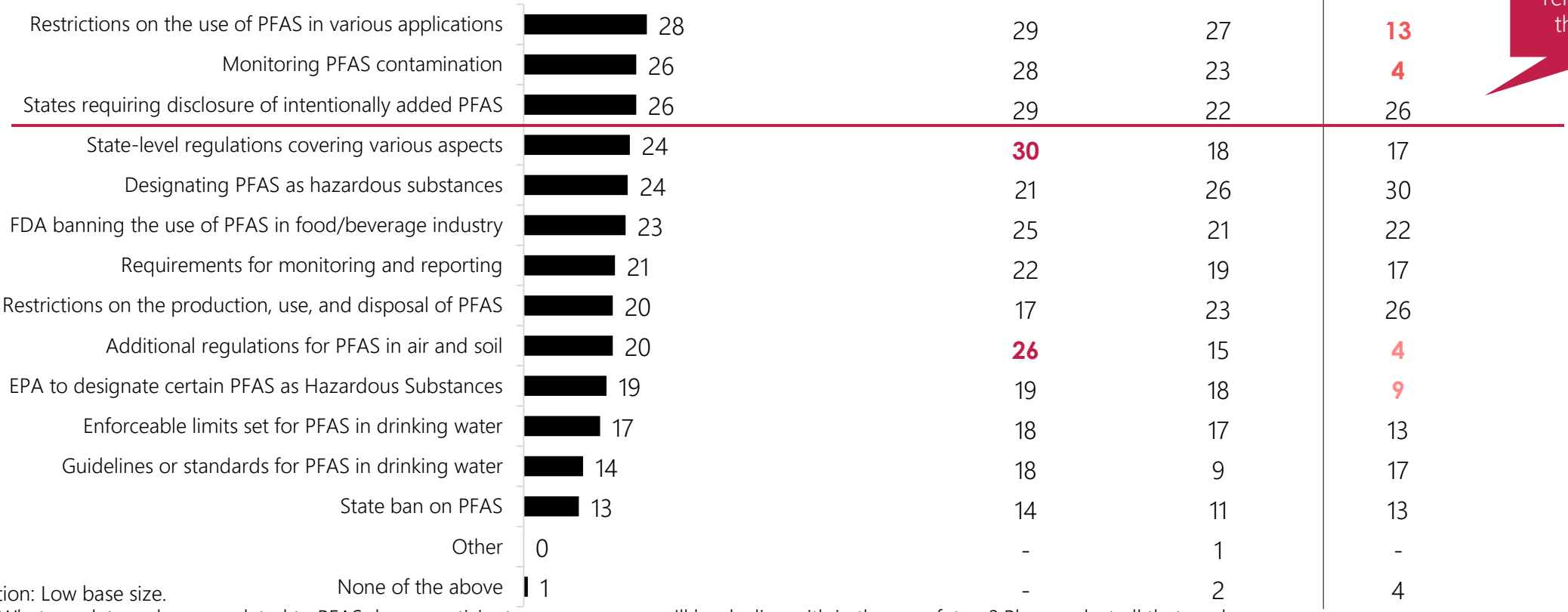


*Caution: Low base size.
Q13. What regulatory changes related to PFAS is your company currently dealing with? Please select all that apply.

RESEARCH STRATEGY GROUP

Companies anticipate they will be dealing with PFAS use restrictions, monitoring PFAS contamination, and mandatory disclosure of intentionally added PFAS in the near future.

anticipated regulatory changes related to PFAS in near future (%)



	total	food/bev. packaging	food/bev. manufacturing	baking
	208	*105*	*103*	*24**
Restrictions on the use of PFAS in various applications	28	29	27	**13**
Monitoring PFAS contamination	26	28	23	**4**
States requiring disclosure of intentionally added PFAS	26	29	22	26
State-level regulations covering various aspects	24	**30**	18	17
Designating PFAS as hazardous substances	24	21	26	30
FDA banning the use of PFAS in food/beverage industry	23	25	21	22
Requirements for monitoring and reporting	21	22	19	17
Restrictions on the production, use, and disposal of PFAS	20	17	23	26
Additional regulations for PFAS in air and soil	20	**26**	15	**4**
EPA to designate certain PFAS as Hazardous Substances	19	19	18	**9**
Enforceable limits set for PFAS in drinking water	17	18	17	13
Guidelines or standards for PFAS in drinking water	14	18	9	17
State ban on PFAS	13	14	11	13
Other	0	-	1	-
None of the above	1	-	2	4

Respondents from baking companies report fewer anticipated regulatory changes related to PFAS in the near future.

*Caution: Low base size.

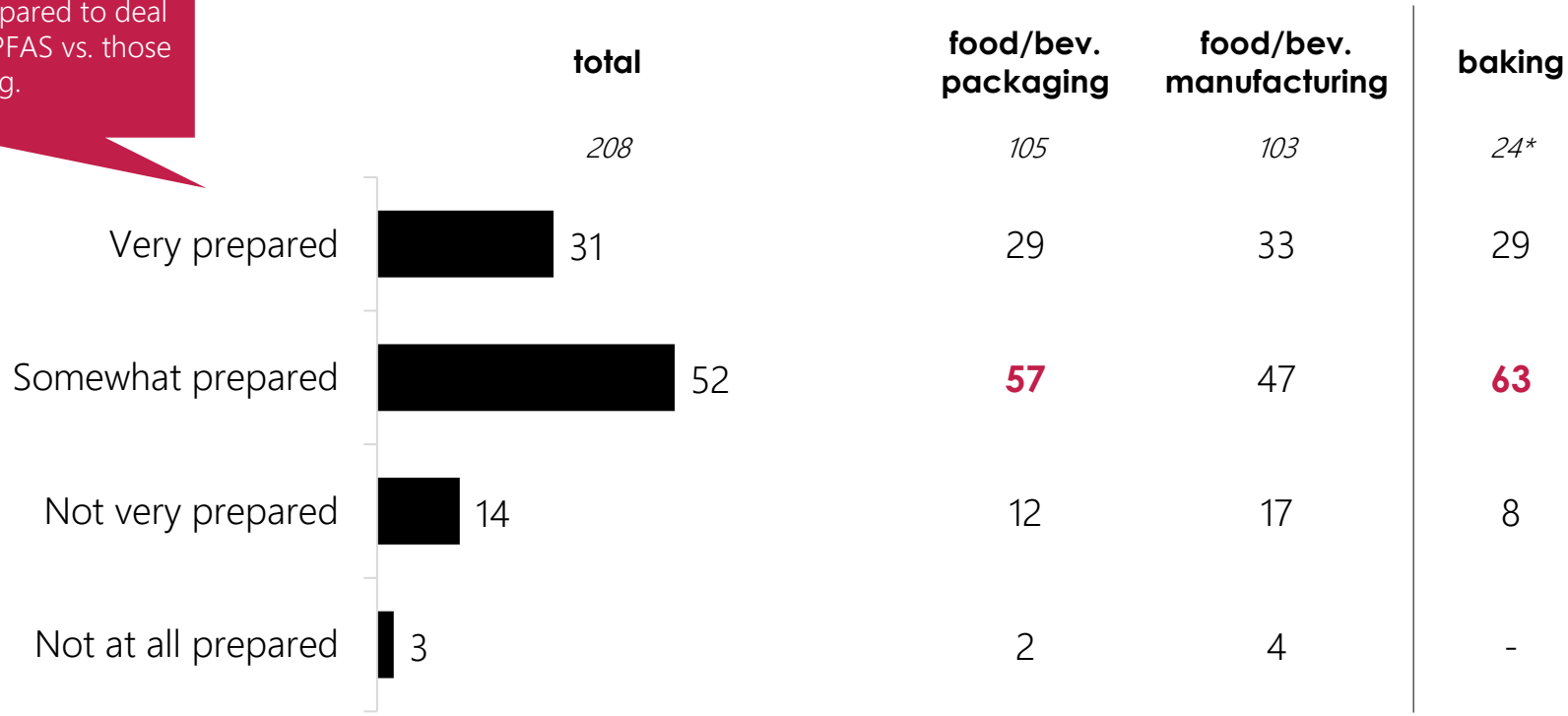
Q14. What regulatory changes related to PFAS do you anticipate your company will be dealing with in the near future? Please select all that apply.

RESEARCH STRATEGY GROUP

Only one-third of respondents report their company is 'very prepared' to deal with state or federal regulations related to PFAS.

Packaging companies are more likely to report being somewhat prepared to deal with regulations related to PFAS vs. those in manufacturing.

PFAS regulations preparedness (%)



Respondents from baking companies are more likely to report that their company is 'somewhat prepared'.

*Caution: Low base size.
Q11. How well prepared do you feel your company is to deal with state or federal regulations related to PFAS? Please select one.

RESEARCH STRATEGY GROUP

detailed qualitative findings

case studies

archetypal ways organizations think and deal with PFAS

Note:
- All company names are fictitious
- Some firmographic details have been altered to ensure anonymity.

RESEARCH STRATEGY GROUP

New and uncharted

The issues of **PFAS in food safety** are new for both regulators and the industry. There is a lot of **uncertainty** and **ambiguity** regarding what and where PFAS are, as well as how to address them. Unlike other issues like Salmonella or BPA, for example, the standards and regulations around PFAS are not as clear cut and vary from state to state. The industry **lacks clarity and certainty**, especially when it comes to the future of PFAS and what to expect from a regulatory perspective.

This has led to much disparity between different organizations regarding their understanding and strategies.

Not knowing what they don't know

Probing deeper into different organizations allowed us to compare their knowledge and preparedness **relative to each other**.

An organization's self-reported **preparedness level** for PFAS issues and regulations **does not necessarily correlate with their actual knowledge and strategy.**

Some organizations who were **very knowledgeable and informed** were keenly aware of the discrepancies between science and regulation and felt they still had a lot to do now and in the future. Conversely, other organizations that had large **knowledge gaps and misunderstandings** regarding PFAS were confident in being prepared and not having to worry about them.

organization archetypes

healthy, sustainable and naive

bare minimum regulation followers

well-organized & methodical

sophisticated & money-backed

low levels of knowledge and preparation	medium levels of knowledge and preparation	medium levels of knowledge high levels of preparation	high levels of knowledge and preparation
medium & high confidence	**high confidence**	**medium & high confidence**	**medium confidence**
Smaller & entrepreneurial, these organizations focus on producing food that is healthy for consumers while minimizing their environmental impact. Assume their natural, organic products are also PFAS-free	Small local & regional processors that are simply running a highly regulated business. Used to complying with ever-changing regulations	Medium-sized companies that have very well-developed organizational tools and strategies. They are very open, collaborative and systematic	Larger national or international corporations that have a lot of resources at their disposal but also much costlier sanctions and responsibilities

healthy, sustainable and naive

VERTICAL

Health, Organic or Natural Foods; Smaller Scale Processed Food Manufacturing, Food and Beverage Packing.

MOTIVATION

Demand comes mostly from their very informed and aware customers.
Main driver is alignment with their corporate values and reason for being: to provide healthier more sustainable alternatives

CONTEXT

Smaller, entrepreneurial organization structure
Employees take on multiple roles

> *"We're trying to leave the planet in a better place and leaving behind a better world for our kids"*
> **- Healthy Snacks Co.**

REVENUE

$250 Million | $500 Million | $1 Billion

EMPLOYEES

500 | 2000 | 10,000 | 100,000 | 500,000

REACH

Local | Regional | National | International

RISK TOLERANCE

Very Low | Low | Medium | High | Very High

KNOWLEDGE

Very Low | Low | Medium | High | Very High

PREPAREDNESS

Very Low | Low | Medium | High | Very High

healthy, sustainable and naive

KNOWLEDGE

- Limited knowledge on PFAS, with lots of gaps and misconceptions
  - Very low awareness of regulatory requirements

PREPAREDNESS

- Largely assume their products are free of PFAS because they assume this naturally follows other health/environmental objectives in production and packaging

CHALLENGES & BARRIERS

- Do not have a person or team responsible for PFAS
- Could be blindsided by discovery of PFAS in areas they thought were safe

ENABLERS & FACILITATORS

- Motivated by ethical concerns
- PFAS goals align with company objectives
  - Driven by consumer demand

"We know there is PFAS in the plastics we use."
- Service & Facilities Co.

"In the organic and natural space… consumers [have] higher risk aversion, more likely to see an article that's not necessarily fully formed science and run with it as a concern"
- Frozen Foods Co.

RESEARCH STRATEGY GROUP

healthy, sustainable and naive

APPROACH

- They would like for it to be absent from their products or packaging, but have not developed any explicit PFAS policies
  - No current plans to create PFAS-specific goals and objectives
- PFAS issues/concerns are folded under larger health & environmental umbrellas such as “Organic” or “Sustainable”
- Rely on suppliers' assurances of their products being PFAS free
  - Have had to switch some suppliers
  - Have done little to no product or packaging testing themselves

“ I feel like we're one step higher because we're using compostable, it's just not in the packaging.”
- Healthy Snacks Co.

NEEDS

- Greater education and awareness
- Training on how to develop strategies and processes
- Access to testing,
  - Help in addressing positive results
- Very likely to be unprepared for:
  - Regulatory requirements
  - Discovery of PFAS in their processes

“We don't do our own testing. Honestly, we just wouldn't have the budget to do that. We have to rely on our partners.”
- Healthy Snacks Co.

RESEARCH STRATEGY GROUP

bare minimum regulation followers

VERTICAL
Meat/Poultry Processing, Baking, Confectionery, Grain and Cereal Processing

MOTIVATION
Compliance with regulatory requirements is compulsory.
Will seek the most economical way to comply

CONTEXT
Small, local operations, usually a single location
Has staff dedicated to compliance.
Strictness of regulations varies by region

> ***"Basically, whatever regulations are in place. I do our best to follow to make sure that our guidelines strictly meet those standards"***
> **- Meat Processing Co.**

REVENUE
$250 Million | $500 Million | $1 Billion

EMPLOYEES
500 | 2000 | 10,000 | 100,000 | 500,000

REACH
Local | Regional | National | International

RISK TOLERANCE
Very Low | Low | Medium | High | Very High

KNOWLEDGE
Very Low | Low | Medium | High | Very High

PREPAREDNESS
Very Low | Low | Medium | High | Very High

bare minimum regulation followers

KNOWLEDGE

- Are fully aware of all local and national regulatory requirements
- Have a decent scientific understanding of PFAS, but is not actively following scientific developments

PREPAREDNESS

- Will comply with regulations in order to stay in business
- Goals and objectives match current and announced regulations
    - This includes phased goals by authorities

CHALLENGES & BARRIERS

- Has a very tight and limited budget
- No motivation to do anything beyond what is required by law

ENABLERS & FACILITATORS

- Are accustomed to taking action to comply with regulatory updates
- Their organizational structure has historically been set up for constant laboratory testing

"We ship to Canada...it's different regulations... we try to use products* [that] *could clear for both regulations. We're still trying not to diminish our standards."
- Meat Products Co.

"Not only do they test for PFAs, but they also help test for mad cow and other organic and biological diseases that may come up"
- Meat Products Co.

RESEARCH STRATEGY GROUP

bare minimum regulation followers

APPROACH

- Have updated policies and standardized procedures. This includes:
  - Testing for PFAS when required
  - Changing equipment and additives
- Ensuring compliance with PFAS regulations falls on the same person in charge of quality assurance and ensuring all other regulatory requirements are met.

"If we're not following what the FDA puts in front of us, then that makes us responsible. At the end of the day, we have to go with what is told by them.
- Meat Products Co.

NEEDS

- Phased regulations that allow time to adapt
  - Grants and subsidies to help update their processes
- Help in staying up to date with changing regulations
- Help in making the changes required to comply with upcoming regulations
- Greater scientific understanding of PFAS

"...especially with California. It's a lot more strict on which type of hormones or what type of contaminants can be around the food to obviously prevent MRSA, influenza, and other health sicknesses
- Halal Meat Co.

RESEARCH STRATEGY GROUP

well-organized & methodical

VERTICAL
Repack, Wholesale, Distribution, Beverage Production, Processed Food, Packaging, Baking, Confectionery, Grain and Cereal Processing

MOTIVATION
Approaches challenges in a timely and orderly manner
Likes staying on top of things and not having loose ends

CONTEXT
Very well established processes and procedures

> *"We started the plan… different departments and different teams… it really involves a lot of work. The reality is that it's not a fast process."*
> - Produce Wholesaler Co.

REVENUE
$250 Million | $500 Million | $1 Billion

EMPLOYEES
500 | 2000 | 10,000 | 100,000 | 500,000

REACH
Local | Regional | National | International

RISK TOLERANCE
Very Low | Low | Medium | High | Very High

KNOWLEDGE
Very Low | Low | Medium | High | Very High

PREPAREDNESS
Very Low | Low | Medium | High | Very High

well-organized & methodical

KNOWLEDGE

- Really well informed on current and upcoming regulations
- Have a good grasp of current scientific understanding

PREPAREDNESS

- Has developed and is implementing simple objectives and complex strategies.
- Has a dedicated supply chain software for vigilance and tracking of vendor network
- Extensive coding of processes and record keeping

CHALLENGES & BARRIERS

- Having an extremely large supplier database
  - There are a lot of players and stakeholders in their system that they need to manage and align
- Aware the challenge isn't over as regulations have just started but scientific understanding points to more coming

ENABLERS & FACILITATORS

- Very experienced with organizational processes
- Leveraged experience and lessons learned from addressing similar issues in the past.

"We have direct communication… it doesn't require to have an annual review with them. We have an open door with all of our customers"
-Produce Wholesaler Co.

"It really took us a year to go through the whole supplier base… evaluating for documentation, verifying… any high risk that we would need to do our own testing for… it was a lot of moving parts."
-Dietary Supplements Co.

RESEARCH STRATEGY GROUP

well-organized & methodical

APPROACH

- Have set goals of total elimination / being PFAS-free
- Assembled internal cross-functional team to develop strategy
- Works in a highly collaborative environment with internal and external stakeholders
- Invested in educating and helping vendors understand reasons behind requirements
- Extensive communications and 'open-door' policy with suppliers
    - Have not needed to switch suppliers as these have been able to comply

NEEDS

- Long-term vision and clarity on regulatory updates and phases
- More in-depth education on scientific understanding in order to proactively plan for future regulation.
- Assistance with testing
    - Finding laboratories
    - Costs

"It definitely required a lot of conversations with smaller vendors for them to understand what was happening."
- Produce Wholesaler Co.

"If you got 300 or so PFAS on your radar, and then you have 15,000 of these PFAS out there… and it's in every product that you can conceivably see as you walk around your house… it's a very complex issue."
-Dietary Supplements Co.

RESEARCH STRATEGY GROUP

‘Fruit Fusion’

- Fruit and vegetable processing company operating in the Great Lakes region
- They buy fruit and vegetables from a range of different suppliers and process them into fruit and vegetable platters, snack pots etc. for sale to consumers in grocery and other food outlets
- About 650 employees that distribute to the entire Great Lakes region and bring in about $600 Million in annual revenue

Stimulus for action on PFAS

- A strong focus on sustainability and commitment to meet targets in that area.
- Aware of PFAS, its potential health risks, and desire to provide assurance on PFAs.
- Customers began to ask about the presence of PFAs in their packaging
- State law in some of the areas in which their facilities are based, and their customers sell, required them to remove PFAS from their packaging

Strategy to address PFAS

- Fruit Fusion set a strategy of eliminating PFAs from their operations.
- Their risk assessment led them to conclude that their key risk was in the packaging used to package the processed fruit and vegetables for market –fruit platters, snack portions etc. Because fruit and vegetables are delivered to them in bulk, they did not perceive any risk from their suppliers.

Their goal was to achieve zero PFAS in their supplier packaging as quickly as possible.

Their approach focused on communicating and collaborating closely with their suppliers

Challenges

- **Working with a very large supplier base to gain assurances** about PFAS has been time consuming.
- **Making sure suppliers truly understood their needs and requirements** and were not simply signing off on forms

RESEARCH STRATEGY GROUP

‘Fruit Fusion’

Actions taken

- **Fruit Fusion consulted with their packaging suppliers** about the presence of PFAS in the packaging used. They had an open and consultative approach at the outset, focusing on working with suppliers to reach the PFAS zero goal.
- They used this consultation to develop two tools:
  - **An education resource for their packaging suppliers** that included key information about PFAS – the risks involved; the requirement for reduction/eradication; the relevant laws and regulations etc. So that suppliers could fully understand their goal and why action was necessary.
  - **A risk assessment tool to assess the PFAS risk** from each packaging supplier and to pinpoint actions as a result
- As a follow-up to this **they worked with each supplier to get them to move towards PFAS free packaging**. Suppliers had to give concrete assurance that they had reviewed the information supplied by Fruit Fusion and that the packaging they supplied to them did not contain PFAS.
- **Suppliers also had to give assurance that they would continue to monitor regulations and industry knowledge about PFAS**, so that if regulations or science changed, they could flag any risk of PFAS in the packaging supply chain. This committed suppliers to stay up to date with changing requirements, and to inform Fruit Fusion if any future risks of PFAS occurred.

Outcomes

- ✓ **Retained all their existing packaging suppliers - either because they could provide assurance the packaging was PFAS free or because they were able to pivot to PFAS free packaging.**
- ✓ **Greater assurance to current and future clients in grocery and other food outlets about the absence of PFAS in their packaging**
- ✓ **Added PFAS risk assessment tool to the supplier onboarding process to ensure that all future packaging suppliers complied with their standards.**
- ✓ **Built a strong partnership with their suppliers in eradicating PFAS.**
- ✓ **Suppliers found the information on PFAS so useful, they shared it with their partners and vendors, to raise awareness of the issues and actions taken as a result, creating a wider industry impact.**

RESEARCH STRATEGY GROUP

‘Supplements Plus’

- is a dietary supplements manufacturer headquartered in California.
- They have a diverse product portfolio, manufacturing and bottling a wide range of liquid and powder supplements. They have some major national grocery and pharmacy retailers in the customer list.
- They employ close to 120 people and an approximate annual revenue of $350 Million.

Stimulus for action on PFAS

- Increased awareness of PFAS within the company and a desire to ensure that their products are not harmful.
- Clear regulation of PFAs in California and the guidance issued by the EPA on eradicating harmful PFAs from products.
- Customer requests for assurance on the presence of PFAs in their supply chain. This came from existing customers and, increasingly, became a requirement when they were onboarding new customers.

Strategy to address PFAS

Supplements Plus set about understanding the extent of the risk from PFAs in their supply study.

They set a goal to at least meet the regulatory requirements in California and to set processes in place so they can be on the front foot in meeting future regulations.

Challenges

- They anticipate that there will be **further regulation in this area** and feel its challenging for them to keep up.
- Because of their broad supplier list and the number of steps involved in gaining information – **it took up to a year for them to work through this process and understand the nature of their risk**

RESEARCH STRATEGY GROUP

‘Supplements Plus’

Actions taken

- Their first step was to **establish an internal committee with representation from key functions** – Inc. regulatory compliance, production, procurement etc. – to understand where PFAS might be present in their supply chain.
- They **reviewed their supply chain, production processes and ingredients**, they came up with a short list of the key risks for PFAS.
- Through **interacting with an external testing agency**, they determined that the actual products they make are nonreactive and not oil based which makes them at minimal risk for presence of PFAS.
- They determined that the main risk of PFAS in their supply chain was in the packaging for their products.
- With the **help of an external supplier compliance agency ‘TraceGains’, they set up a PFAS risk assessment tool** to understand which of their packaging suppliers had products that contained PFAS or to ask for testing to determine whether it did or not.
- They continue to use ‘TraceGains’ to vet all new suppliers on their exposure to PFAS and have added a focus on PFAs to their change control procedures. **They also require all existing suppliers to continually update their ‘TraceGains’ profile to alert them to ask emerging risks on PFAs contamination**. This information is reviewed quarterly.
- **They worked with suppliers** who did have PFAS in their packaging, where there was a willingness **to pivot to PFAS free packaging**. Unfortunately, they had to drop some suppliers who were not able to comply with their requirements.

Outcomes

- ✓ **The process enabled them to develop a clear set of criteria for assessing PFAs risk in their supply chain and gave them a clear understanding of their company’s risk to PFAS.**
- ✓ **By doing this, they were able to gain assurance from suppliers who were PFAS free.**
- ✓ **This meant that they were able to give their customers the assurance they needed about the presence of PFAS in the products sold to them.**
- ✓ **Are now confident that the process they have been through will help them respond well to changes as they occur.**

RESEARCH STRATEGY GROUP

‘South St. Meats’

- **is a meat processing company based in Mississippi. It butchers and processes a range of different meats and meat products for sale to the catering industry, grocery stores and delis.**
- **Their facilities employ about 150 people, and they have an annual revenue of approximately $4 Million.**

Stimulus for action on PFAS

- **Increased regulations on PFAs in several US states**
- **A fear that lack of action could lead to sanctions or financial penalties from regulatory bodies.**
- **Media reports on litigation has concerned them that they could be open to legal action if they do not take the lead on eliminating PFAS.**

Strategy to address PFAS

- The main goal for ‘South St’ is to comply with the highest level of regulation in the country. They feel that in the absence of federal regulation, ensuring compliance with the requirements of the states with the most restrictive policies on PFAS will enable them to meet the needs of all other states as they emerge.

The aim is also to exceed the EPA’s guidelines of reducing PFAS to within 100 parts per billion, where they exist.

Challenges

- **Scientific knowledge about PFAS and the regulation of it is constantly changing**. Every time they feel like their response is adequate, they discover some new requirement or area of their process that needs action.
- Although they have aimed high in attempting to meet the highest standards in the country, they feel that **the lack of clear and actionable federal regulation by the FDA has been a challenge to them** in their aim to reduce the risk from PFAS in their operation.

RESEARCH STRATEGY GROUP

‘South St. Meats’

Actions taken

- ‘South St’ took time to **understand the risk for PFAS throughout their operations** – from the animals they process, the other ingredients used, the packaging the ship products in and in the machinery they use to process meats.
- They **networked with others in the meat processing industry to establish what they were doing to tackle the issue** – including getting advice about testing and supplier vetting.
- The **developed a strong relationship with a local facility that tests for PFAS.** This company doesn’t just test but also offers advice and consultancy on the tackling the issue, actions to prioritize etc. They also keep records of the testing conducted and can be used to provide assurance where required.
- ‘South St’ have **initiated an ongoing testing protocol to provide continued assurance.** They aim to test all elements of their process and packaging every six months.
- As a result of testing, they had to **alter some of their production processes** – such as overhauling some of the equipment used which has non-stick coating (which may contain PFAS) or to stop using certain kinds of oils on the slicing or cutting machinery that, while considered safe, may contain PFAS.
- They have **conducted a supplier audit to get assurance on their practices, and the products they source from them**. While many of their suppliers do comply with the same standards, they have also switched out some suppliers who do not, for example with the packaging they use or the inks or dyes they use in the processing.

Outcomes

- ✓ **‘South St’ feel that they have a good knowledge of the presence of PFAS in their supply chain and operations.**
- ✓ **They are confident that they are within the EPA guidelines and meet the strictest requirements in place in the US. And they can offer this assurance to their clients.**
- ✓ **They feel well placed to respond to any future requirements as state or federal level.**

RESEARCH STRATEGY GROUP

sophisticated & money-backed

VERTICAL — Large Scale Processed Food Manufacturing, Beverage Production, Food or Beverage Packaging

MOTIVATION — Would like to avoid costly penalties and litigation
PFAS just one of many regulatory obligations

CONTEXT — Very large organizations with deep pockets and resources

> ***"We hired probably one of the best in the area... They still don't know what to do. These are basically the gurus for this, but they don't know."***
> **-Scents and flavors Co.**

REVENUE

$250 Million | $500 Million | $1 Billion

EMPLOYEES

500 | 2000 | 10,000 | 100,000 | 500,000

REACH

Local | Regional | National | International

RISK TOLERANCE

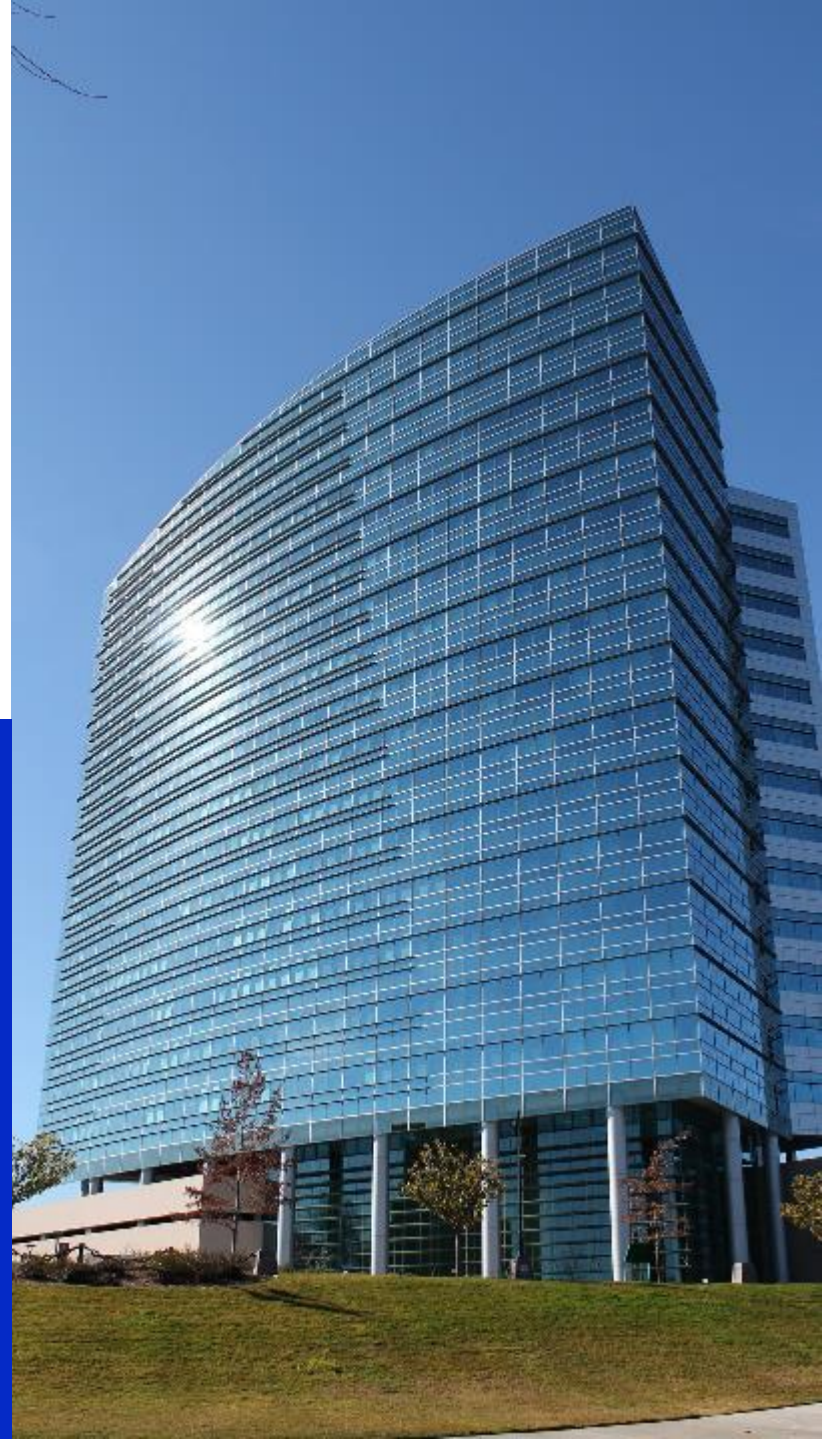
Very Low | Low | Medium | High | Very High

KNOWLEDGE

Very Low | Low | Medium | High | Very High

PREPAREDNESS

Very Low | Low | Medium | High | Very High



sophisticated & money-backed

KNOWLEDGE

- Very well informed on regulations and scientific understanding
  - Can see the gaps and disparities between current regulations and science

PREPAREDNESS

- Continuously monitoring regulations
  - Base their decisions on the regulations of the strictest state
  - Do testing as needed, but impacted by costs at scale
- Ready to act on any new regulations

CHALLENGES & BARRIERS

- Frustrated by lack of regulatory certainty and clarity
  - Unable to act firmly while still in a regulatory grey area
- Often at the frontlines of new regulations, sometimes as test subjects
- Water is a particularly big concern
- Replacing old technologies and equipment

ENABLERS & FACILITATORS

- Have a lot of resources at their disposal
- Staff are well-informed and willing to act

"Trying to come into 'compliance' with something that is not yet fully defined, It's very difficult to do."
- Frozen Foods Co.

"They [treat] us as a Guinea pig, anytime they have a new thing to try. 'If they can pass it, definitely all other sites can'."
- Scents and flavors Co

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APPROACH

- Seek to comply with all applicable regulations
- Because of their size, there are regulatory spaces that apply to them (such as waste water treatment, soil remediation) but the PFAS laws and regulations are not well defined
- Have the money to hire the necessary consultants
- Have tried to stay ahead of regulations without clarity on what targets to meet

> ***"It was a little bit of a 'ready, fire, aim' response by industry***
> **- Frozen Foods Co.**

NEEDS

- Concrete standards that can be realistically met.
- Greater certainty around regulations
- Greater clarity on government expectations
  - Consultants that can provide advice based on regulatory certainty
- Better ways to test
  - Less expensive
  - More effective and precise

> ***"Because you don't have anything regulated, you're left to figure it out on your own and hope when it does become regulated that you're covered."***
> **- Pizza chain**

RESEARCH STRATEGY GROUP

‘American Pizza’

- **is a national QSR brand with almost $1 billion in annual revenue last year.**
- **They have over 10,000 employees and serve customers in thousands of outlets nationwide**

Stimulus for action on PFAS

- **They have observed a growing focus on PFAs in the trade press and mass media.**
- **They are concerned by legal action taken against other QSR brands because of PFAS found in their packaging.**
- **They feel that stronger regulation is coming the track, and they want to be prepared for it.**

Strategy to address PFAS

American Pizza’s current strategy is twofold:

Learn as much about PFAS as possible so that they can mitigate risk to their company’s operations

Act where it is necessary to protect customers or as required by lawmakers

Challenges

- **The patchwork of regulation across the country** is problematic and that responding to PFAS would be simpler if there was a consistent level of expectation across the country.
- Although they have assurance from their current ingredient and packaging suppliers that there is minimal to now risk of PFAS now, they feel that its going to be **an ongoing challenge to retain that assurance**, **especially as new suppliers come on board**.
- They are concerned that any **lack of compliance by suppliers** (despite written assurance on PFAS) **will open them up to risk of litigation in the future**. In some cases, supply chains are long and just because their immediate supplier has given assurance, they can’t always be sure this extends to their suppliers.
- They are **unsure about the right frequency for rechecking supplier assurances** and or retesting thee packaging they use – should it be yearly or more often than that?
- The **cost of testing is high**, and they feel that this is a disincentive to do it more regularly. It could also lead to price increases from suppliers if they have additional costs in production.

RESEARCH STRATEGY GROUP

‘American Pizza’

Actions taken

- They have **identified a lead for knowledge about PFAs** within their company. This person has reviewed scientific evidence, attended industry events, and consulted with experts in the field, such as prominent academics on the topic.
- They have **conducted rigorous testing of the packaging they use for their QSR products**. They have been pleased to learn that the packaging used doesn’t contain any PFAS right now. This is because none of their packaging is grease resistant and doesn’t use any coatings – both of which increase the risk of PFAS.
- They have **tested all the packaging that received from suppliers of ingredients.** Here there were traces of PFAs found but the advice they received from consultants was that the level is minimal, and well below any of the regulatory limits in place in the US.
- In addition to testing, they **have required their current suppliers to give them written assurance that they do not intentionally add PFAS** to their products.

Outcomes

- ✓ **For now, they are assured that the risk posed by PFAS to their operation is minimal or none. They can provide this assurance to customers when asked.**
- ✓ **They feel like they are growing in their confidence about responding to the business threat posed by PFAS, but they still think they have a journey to travel as a company (and as an industry).**

RESEARCH STRATEGY GROUP

‘Martha’s Meals’

- **is a family-owned, and California-based, company with production facilities in different states.**
- **They manufacture and distribute a wide range of frozen meals, with a focus on organic or non-GMO products and ingredients. Their main customers are grocery stores and food service businesses nationwide.**
- **Their almost 3000 employees helped bring in over $500 Million in revenue last year.**

Stimulus for action on PFAS

- **Martha’s Meals is a leader in natural and organic foods industry. They pride themselves on taking concerns around toxicology, food safety and potential impact on health seriously.**
- **Their customer base and prominent lobby groups in the organic and natural foods category are highly sensitive to concerns about ingredients and additives in food.**
- **Media reports on PFAS raised concerns among customers about the presence of PFAS in their products and the packaging.**
- **Being based in California – there are now specific regulations banning the use of long and short form PFAS in the food and beverage packaging which they have had to comply with..**

Strategy to address PFAS

- Their main objective was to eradicate PFAs from their packaging – both from the suppliers of their ingredients and the packaging used for their own frozen products.

Martha’s company goal is to have a complete absence of PFAS in their supply chain and packaging and to have clear messaging for their customers which assures them about this.

Challenges

- It **took time to assemble the right evidence and expertise to assess their risk of exposure to PFAS**. This slowed down the vetting if suppliers and ultimately the eradication of it from their packaging.
- Though they have taken action, they have been doing this in the **absence of clear guidance and regulation.** Even with the recent regulatory changes in California, they feel there is a need for greater standardization of and clarity of requirements for companies like them across the country.

RESEARCH STRATEGY GROUP

‘Martha’s Meals’

Actions taken

- They started work on PFAS in 2016. The sustainability director took a **leadership role in understanding as much as possible about the risks** from PFAS to their operations and products.
- They consulted a range of sources from academic papers and grey literature to ensure they had the most up to date scientific information. They also **consulted with key experts in the issue**, such as the Biodegradable Products Institute and the Sustainable Packaging Coalition.
- The team at Martha’s **developed a risk assessment tool to assess the level of risk from their suppliers** which they got every supplier to complete.
- Through this they **identified approximately 20 suppliers whose packaging contained PFAS**. They **worked with these suppliers to pivot to PFAS free packaging**. Most of them were able to comply. The ones that couldn’t were removed from their vendor list.
- **All suppliers now have the certify that they have tested for PFAS** in their packaging and provide assurance that it is not present. Martha’s themselves do not conduct any testing for PFAS.

Outcomes

- ✓ **They now believe that their products are PFAS free, and they fully comply with California regulations on packaging. They can give concrete evidence to their customers that they have done a detailed assessment of the supply chain.**
- ✓ **All new suppliers are assessed for PFAS using the risk assessment tool.**
- ✓ **They continue, as a company, to stay up to date – on both scientific, regulatory and NGO activity.**

RESEARCH STRATEGY GROUP

healthy, sustainable and naive

KNOWLEDGE	Low-Med
PREPAREDNESS	Low
CONTEXT	Small, Entrepreneurial
MOTIVATION	Moral, Customers
APPROACH	Non-specific
CHALLENGES	Limited Knowledge, personnel
ENABLERS	Alignment with Organization

bare minimum regulation followers

KNOWLEDGE	Medium
PREPAREDNESS	Med - High
CONTEXT	Small, Regional
MOTIVATION	Regulatory Compliance
APPROACH	Testing and Standardization
CHALLENGES	Limited resources
ENABLERS	Regular practice

well-organized and methodical

KNOWLEDGE	Medium
PREPAREDNESS	High
CONTEXT	Medium, Structured
MOTIVATION	Doing things right
APPROACH	Collaborative, Communication
CHALLENGES	Regulatory Uncertainty
ENABLERS	Diligent, orderly

sophisticated & money-backed

KNOWLEDGE	High
PREPAREDNESS	High
CONTEXT	Large, Established
MOTIVATION	Costs, Penalties
APPROACH	Testing, Updating
CHALLENGES	Structural inertia, Regulatory uncertainty
ENABLERS	Monetary and Human resources

key actions taken
and challenges encountered

hallmarks of good practice in tackling PFAS

- ✓ **Set up a knowledge base to assemble scientific, regulatory and industry knowledge**. This is often a key first step in guiding a company response to the issue. Some have appointed specific individuals or teams to lead on this. And keep it up to date as the knowledge and regulation evolves.
- ✓ **Conduct testing of the materials, ingredients or machinery used in the production and packaging of products**. To check for levels of specific types of PFAS.
- ✓ **Carry out an open consultation with suppliers about their knowledge of PFAS and their approach to eradicating it.** Here the focus is on developing a partnership approach in reaching zero PFAS, rather than simply on enforcement and assurance.
- ✓ **Proactively educate suppliers about the risks posed by having PFAS in the supply chain** to raise awareness amongst them and prompt action.
- ✓ **Develop a risk assessment tool to determine the level of risk from products and packaging they procure from their suppliers**. Some administer this themselves whereas others use external supplier compliance assurers such as 'TraceGrains'
- ✓ **Seek written assurance from suppliers** about the absence of (intentionally added) PFAS in the products or packaging they supply.
- ✓ **Set up agreements with suppliers to mandate them** to update on any changes to the PFAS risk in the packaging and products that they supply
- ✓ **Develop a plan of action to suppliers on the things they need to do to reach required compliance on PFAS.** Aim to help suppliers to pivot to PFAS free packaging rather than losing them because of non-compliance.

Challenges faced by companies in responding

- **The time taken to learn about PFAS and to develop a strategy for the company.** Many companies are starting from a low level of understanding and need to understand where PFAS exists in their processes and how to eradicate it.
- **Lack of federal leadership on regulation.** The most common frustration was not knowing how the lack of clear federal regulation on the issue of PFAS. This has led to a patchwork of regulation across the country which is particularly problematic for those who work across state lines.
- **Scientific knowledge about PFAS and the regulation of it is constantly changing**. Every time companies feel like their response is adequate, they discover some new requirement or area of their process that needs action.
- **Assurance and compliance across a large supplier base.** The job of researching, educating, assessing supplier risk and initiating change has demanded a lot of time and resources from these organizations.
- **The decision to test or seek assurance.** Testing is a financially costly route, while relying on supplier assurances involves a lot administrative work. Written assurance is also only as good as the supplier's word. Requiring suppliers to do testing themselves could also lead to price increases from them.
- **Establishing a testing protocol.** The high costs involved and the search for a certified laboratory are challenges in setting up a testing protocol. There is also a lack of knowledge on how regular testing should occur.

needs

gaps and challenges where AIB could provide assistance

healthy, sustainable and naive

NEEDS

EDUCATION Scientific understanding regulatory requirements

TRAINING How to develop strategies and processes
- For regulatory requirements
- Discovery of PFAS in their processes

TESTING Access to
Help in addressing positive results

REGULATIONS Education and Training

bare minimum regulation followers

NEEDS

EDUCATION Greater scientific understanding

TRAINING Help staying up to date with changing regulations

TESTING Reduced turnaround times
Lower Costs

REGULATIONS Phasing, allowing time to adapt
Grants and subsidies to help make changes required to comply with upcoming regulations

well-organized and methodical

NEEDS

EDUCATION More in-depth scientific understanding to proactively plan for future regulation

TRAINING --

TESTING Assistance
- Finding laboratories
- Costs

REGULATIONS Longer-term vision and clarity

sophisticated & money-backed

NEEDS

EDUCATION Consultants that can provide advice with certainty

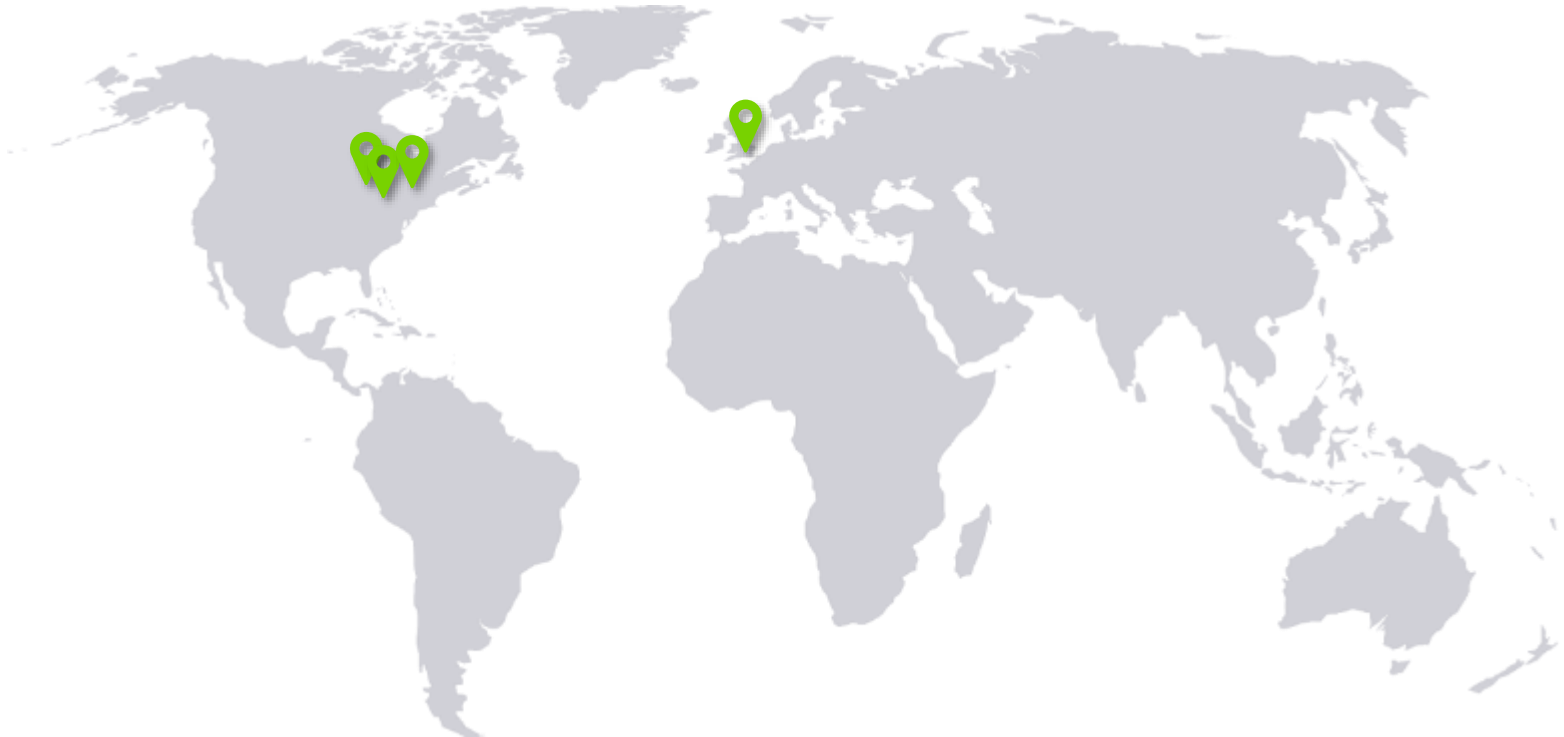
TRAINING --

TESTING Better ways to test
- Less expensive
- More effective and precise

REGULATIONS Greater certainty
Clarity on government expectations
Concrete standards that can be realistically met.

RESEARCH STRATEGY GROUP

toronto | chicago | minneapolis | london



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2023 TOP 50 MOST INNOVATIVE SUPPLIER