



Global Lighthouse Network

Research Survey

October 2023

About this Research Survey



Context

This survey was launched on behalf of the Global Lighthouse Network, a World Economic Forum Initiative in collaboration with Foxconn Industrial Internet, Johnson & Johnson, Koç Holdings, McKinsey & Company, Schneider Electric and Siemens.

McKinsey & Company designed, executed, and analyzed the survey responses.



Methodology

A company-level survey focused on Supply Chain Resilience, Workforce Enablement, and Data Infrastructure was sent to the 70 companies representing 132 'Lighthouse' factories that are members of the Global Lighthouse Network as of July of 2023. **30 companies** responded to this survey.

A site-level survey was sent to all 132 'Lighthouse' factories that are members of the Global Lighthouse Network as of July 2023. This survey was focused on financial impact of 'lighthouse' use cases. **54 sites responded** to this survey.

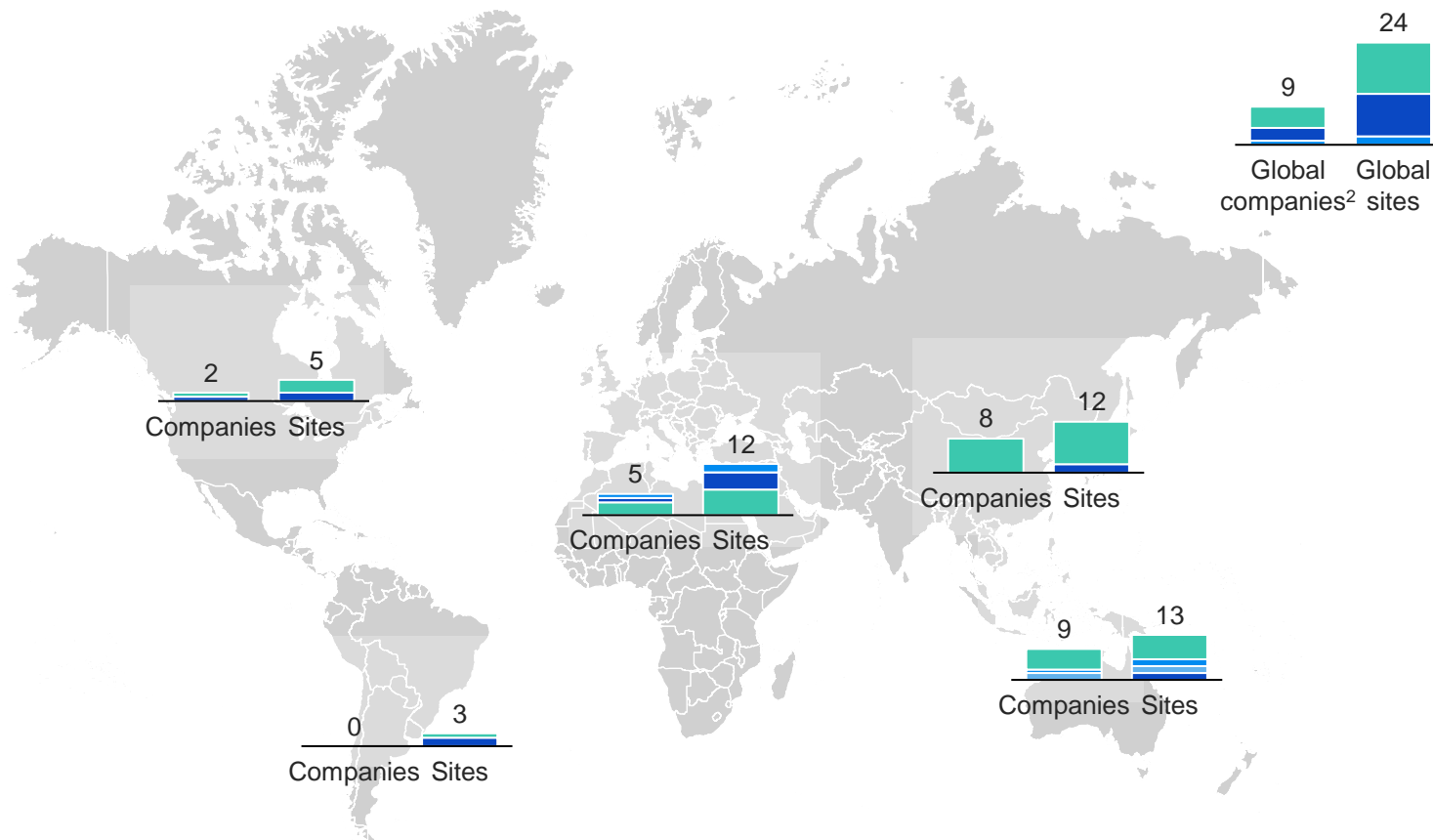
Respondents represent all global regions (EMEA, Asia, China, N. America, and LatAM) and all industry sectors (AI, CPG, PMP, Process industries)

Select responses were compared with benchmark data, for instance McKinsey's Supply Chain Pulse survey and S&P 500 indices.

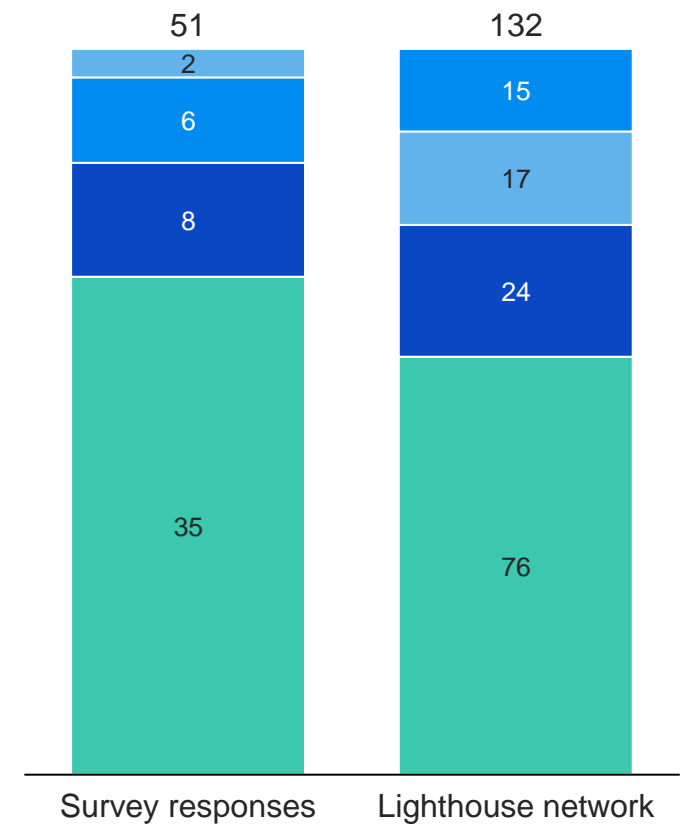
Breakdown of survey respondents: ~40% response rate out of 132 Lighthouses representing 70 companies

■ Advanced Industries (AI)
 ■ Consumer Packaged Goods (CPG)
 ■ Process industries
 ■ Pharmaceutical and Medical Products (PMP)

Lighthouse companies represented in survey, # companies¹



Industry breakdown comparison, # of total sites



1. n=51, Lighthouse companies with completed survey responses; 2. Global presence indicates companies with factories in more than 1 region

Insights from 5 years of Lighthouses: Industry 4.0 has moved from pilots to playbooks, the new focus is speed and scale

Though they face the same challenges as others, technology foundations have enabled Lighthouses to react faster and more effectively

70% of Lighthouses reported **supply chain and energy price risks**, including raw material supply **shortages**, supplier **delays**, and shipping **bottlenecks**
80% of Lighthouses reported **skills gaps and shortages**, including **retention** and **worker engagement** challenges
85% of Lighthouses experienced dips in revenue of <10% even in the height of the pandemic. Only **14%** of other manufacturers can say the same
Technology enabled lighthouses to do more than just increase inventory. Today **2/3** of Lighthouses have already implemented dual-sourcing and supply chain regionalization strategies, while less than **20%** of other companies have done so

Lighthouses select new use cases based on business need ...

Since 2020, Lighthouses have built resilience by deploying with nearly **5** new use cases per company, with a specific focus on **supply chain management** (2 use cases) and **data / IT resilience** (~2 use cases)

Lighthouses are also taking a **holistic approach to workforce enablement** – **75%** have implemented an **advanced use case** against **each one of five workforce priorities**: skill development, skill augmentation, work augmentation, experience and safety

And are calibrated on value capture expectations – not going too slow or too fast

On average, **Lighthouse sites** realize **4-5x ROI** over 5 years from their use cases, which take an average **10-20 months** to implement
Lighthouses typically expect a **payback period** of **1 – 3** years, though this is typically **faster** for **planning and procurement (~1 year)** and **slower** for **asset-related use cases (2-3 years)**

Business-based strategies are enabled by a strong foundation in people

Digital continues to be a strategic priority for lighthouses as **66%** of lighthouses have made significant investments in digital to achieve lighthouse status, of which **88%** have plans to continue to invest significantly

61% of Lighthouses name **Transformation Office** and **IIoT Stack** as the two most important for successful transformation

On average, Lighthouses have created about **25 new digital roles per 1,000 Factory FTE** to enable transformation, primarily **Transformation leaders** and **Automation specialists** to site operations teams, and **Data scientists** to analytics COEs

Most lighthouses – ‘advanced scalers’ in particular – hire onsite, with **71%** of **new FTEs** (including IT and engineering FTEs) placed at the site location

... and a focus on technology that can help unlock speed and scale as the next horizon

Lighthouses increasingly developed in-house – particularly for **AI / ML models** where **~50%** of use cases are developed in house

This has helped **accelerate implementation speeds** for new use cases by **26%** on average and by **49%** for digitization technologies.

Those who scale best – ‘Advanced Scalers’¹ – pick one approach to implementation and stick with it, using ‘combination’² approaches **11%** less than non-scalers. They also make the most of **Joint Ventures**, using them **15%** more often than ‘non-scalers’.

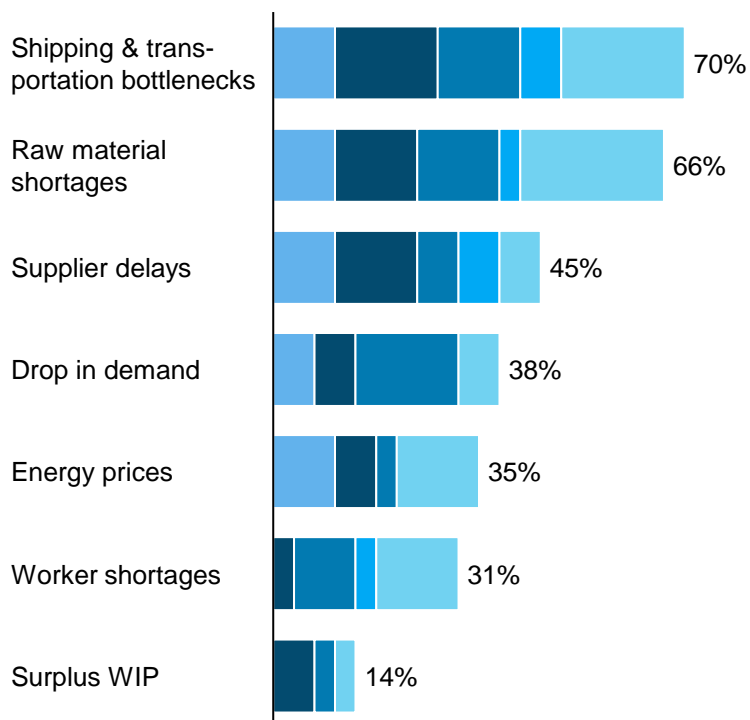
Now, 82% of new use cases are being designed with scale as the first priority

1. Companies with 3 or more lighthouse locations 2. For example, development approaches that involve working with multiple partners such as vendors, academics, and in-house developers

Lighthouses have faced many of the same challenges as their peers, including supply chain disruptions and worker retention

EMEA AsiaX China North America LatAM Global

Supply chain risks faced by Lighthouse companies, % of respondents by region¹



McKinsey SC Pulse Survey Comparison

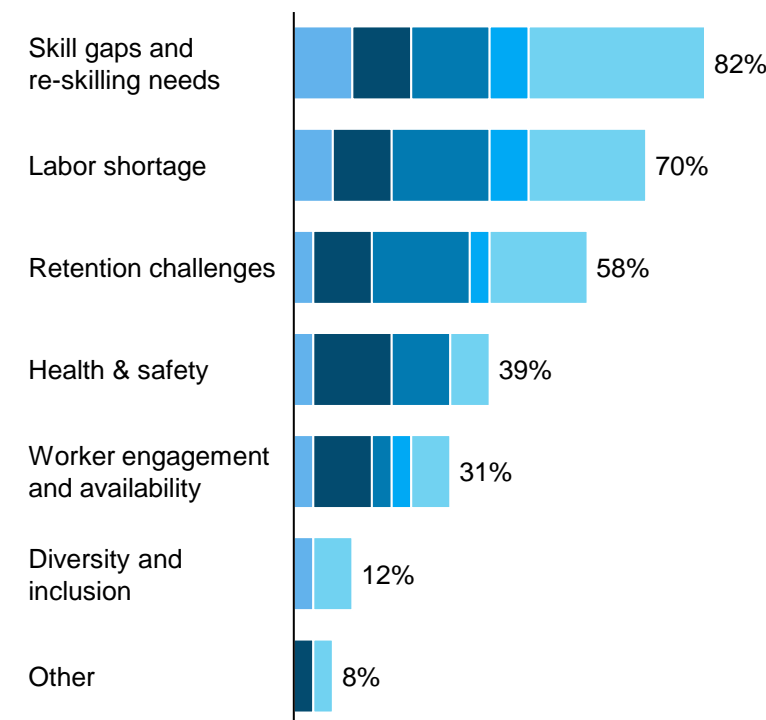
June 2023²

95% of respondents said disruptions caused **challenges in their footprint**

86% faced **internal, demand or supply risks**

49% had **major planning challenges** surfaced by supply chain disruptions

Workforce challenges faced by Lighthouse companies, % of respondents by region¹



McKinsey SC Pulse Survey Comparison

June 2023²

92% of respondents said they lacked **sufficient in-house talent to implement digital ways of working**

70% increased **digital talent** by hiring from **external labor market** instead of **reskilling internally**

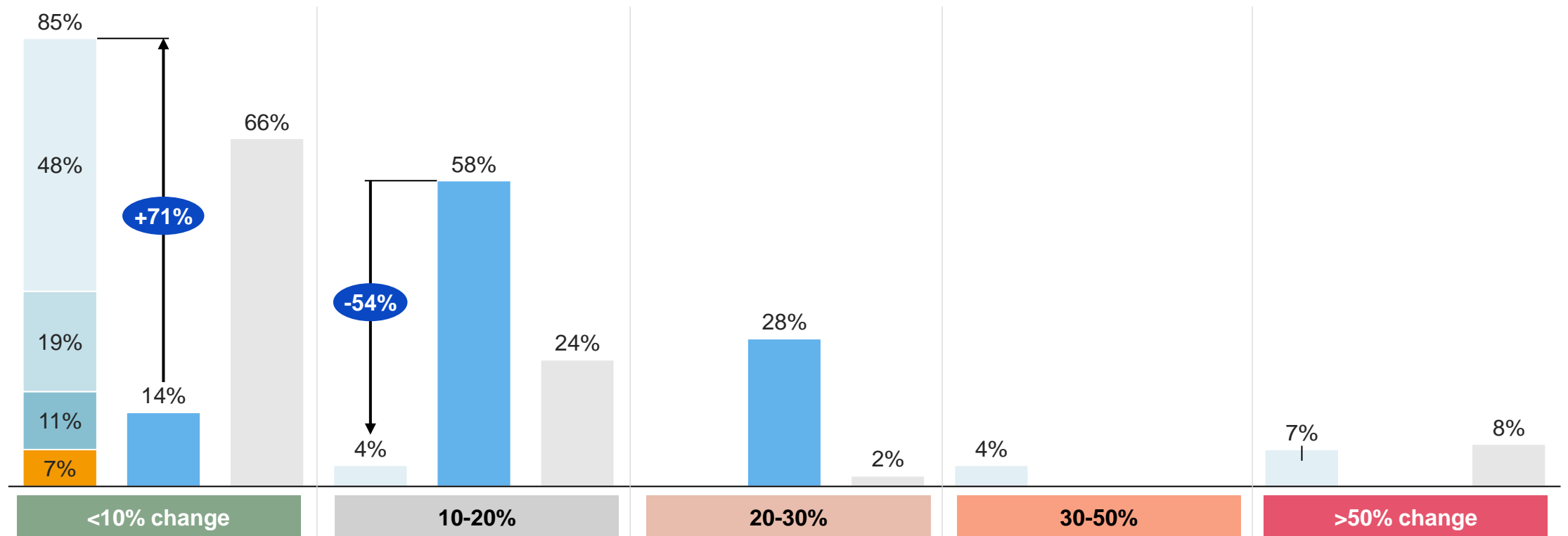
1. n=30 Lighthouse company responses 2. n=101, SC Risk Pulse Survey, data captured April-May 2023

Original question(s): (1) What were the main supply chain risks or shortages you experienced during the last 2 years due to the various supply chain challenges (COVID-19 crisis, semiconductor shortage, conflict in Ukraine, etc.) ? (2) What were the main workforce-related challenges you have experienced during the last 2 years? Please select your top 3 answers (2)

85% of Lighthouses experienced revenue dips of <10% even in the height of the pandemic – compared to 14% of other manufacturers

AI CPG Process ind PMP Industry-weighted S&P 500³ S&P 500

Lowest level of revenues experienced by quarter vs. 2019, distribution of Lighthouses by Industry¹ and S&P Indices²



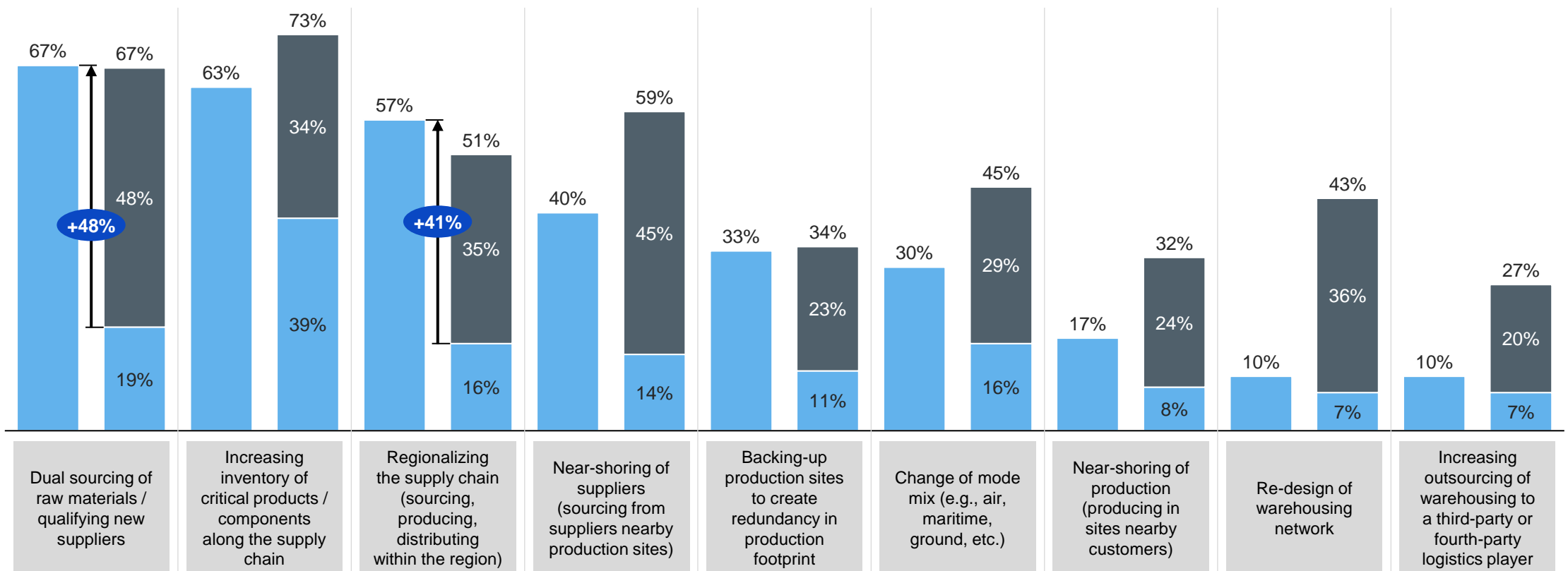
1. n=27, number of Lighthouse company respondents 2. Industry-weighted S&P 500: n=176 weighted to match Lighthouse industry composition; S&P 500: n=416 excluding companies with incomplete reporting periods
 Industry-weighted S&P 500 is a market-capitalized weighted index of 500 global manufacturing companies, adjusted to match industry composition of Lighthouse respondents:
 Industry filters: excludes Real Estate, Financials & Communication Services; includes Automotive & assembly, Basic materials, Pharma & biotech, Consumer durables, Industrial & Electronics, Oil & Gas and CPG
 Lighthouse weighting breakdown: 63% AI, 19% CPG, 11% Process industries, 7% PMP

Original question: Economic shock: Since the beginning of the COVID-19 pandemic, what was the lowest level of revenues that your company's lighthouse locations experienced relative to 2019 (total across all lighthouses)? Please provide answer on a quarter-over-quarter basis (for example: if your Lighthouses experienced their lowest revenues in Q1 2021, please calculate the value as Q1 2021 revenues divided by Q1 2019 revenues)

Nearly 2/3 of Lighthouses have already executed dual-sourcing and supply chain regionalization strategies, vs 20% of other companies

■ In progress ■ Complete

Comparison of strategic resilience actions implemented – Lighthouses vs. Other Manufacturers, % of total respondents



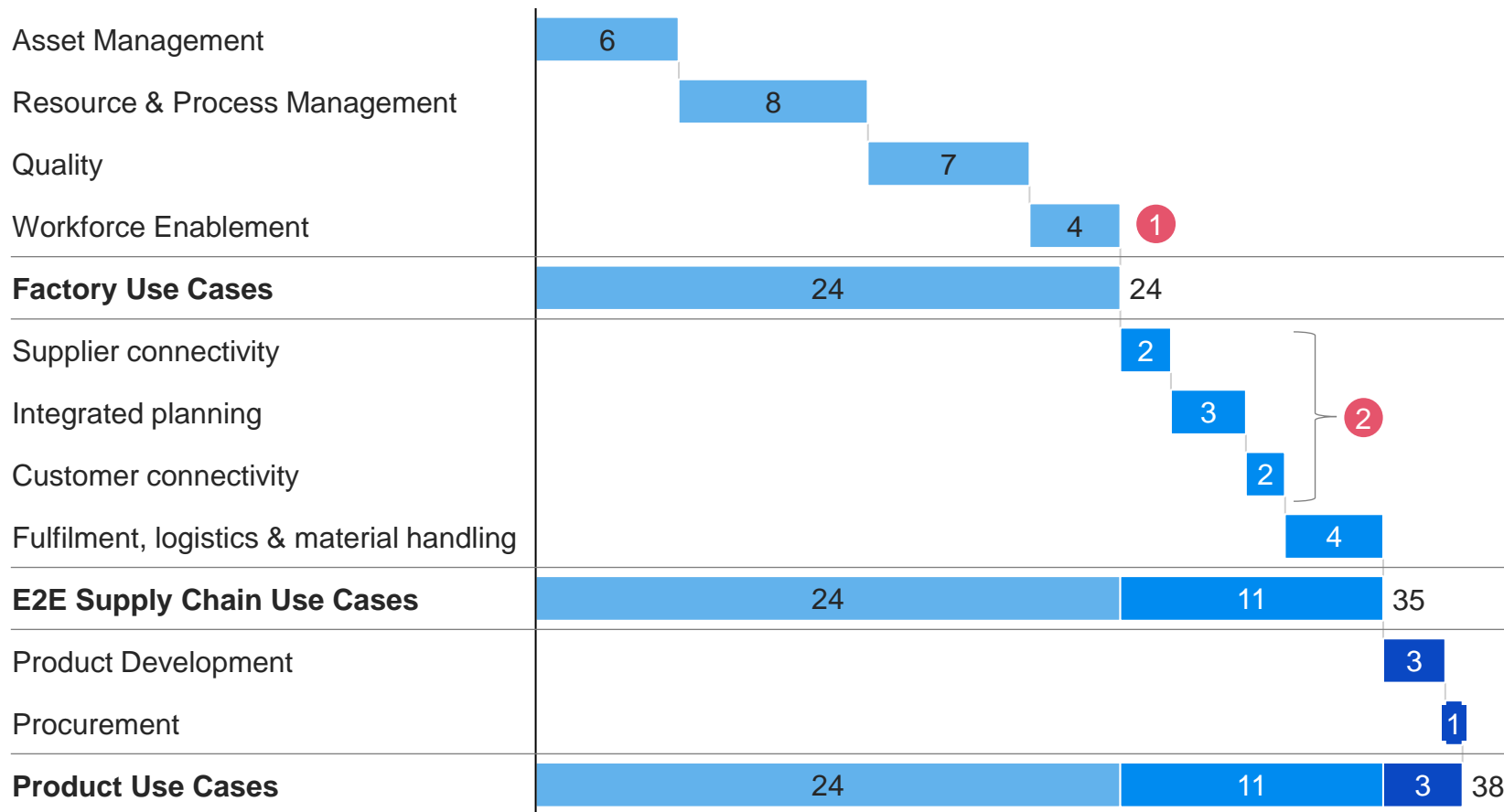
Lighthouses: n=30, number of Lighthouse company respondents, August 2023; Other companies: n=101, number of respondents to McKinsey Supply Chain Risk Pulse Survey, May 2023

Original question: Economic shock: Since the beginning of the COVID-19 pandemic, what was the lowest level of revenues that your company's lighthouse locations experienced relative to 2019 (total across all lighthouses)? Please provide answer on a quarter-over-quarter basis (for example: if your Lighthouses experienced their lowest revenues in Q1 2021, please calculate the value as Q1 2021 revenues divided by Q1 2019 revenues)

On average, Lighthouses implement nearly 40 use cases, of which ~25 focus on the factory

Details follow

Breakdown of use cases by domain, average # of 'advanced' use cases per Lighthouse site



Insights

- 63 use cases in Workforce enablement specifically started pivoting to address key challenges like **retention**, **skill gaps**, and **labor shortages**
- Of all 'front office' use cases cited for 'top' resilience impact, ~70% focus on the **E2E supply chain**

'Back office' use cases make up ~30% of all resilience use cases – with primary focus on cybersecurity and compliance

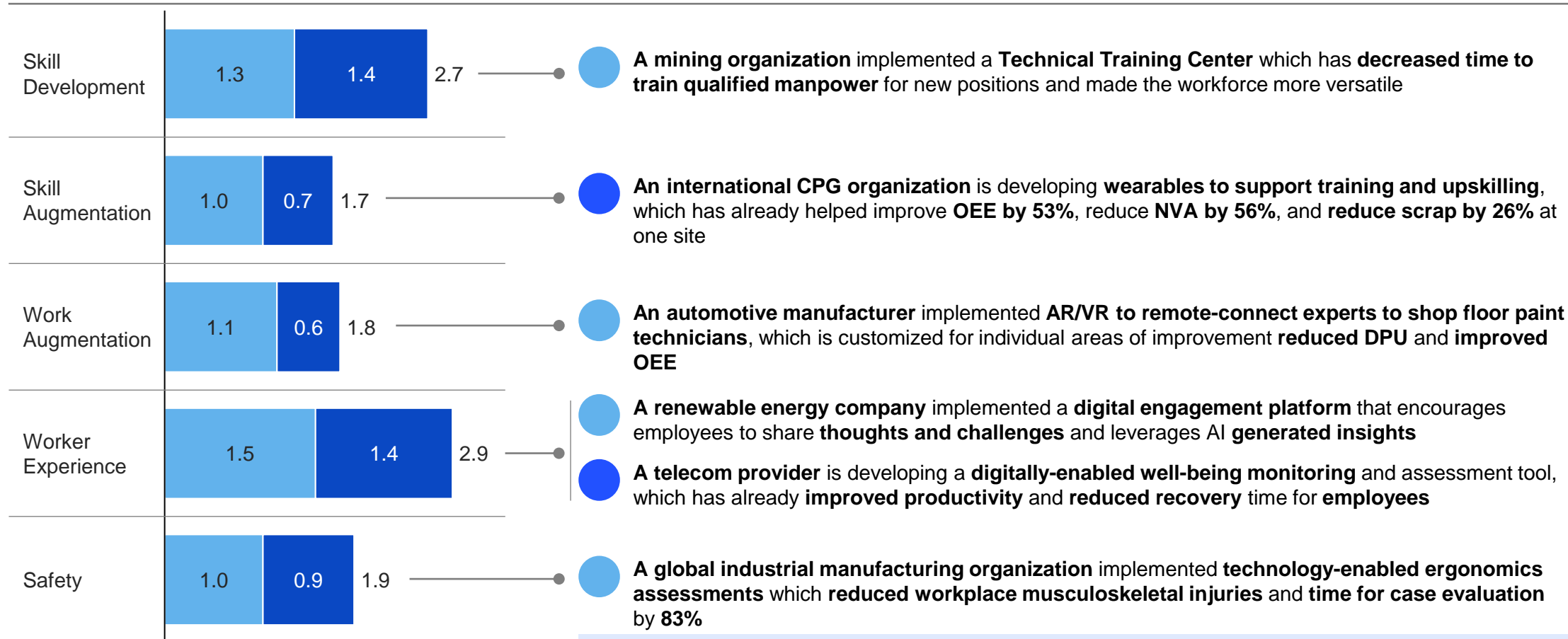
n=17, number of Lighthouse site respondents from Wave 9 with sufficient data to map full use cases

Original question(s): (1) This section will explore the digital use cases your site has implemented since 2020 to build resilience in the face of economic uncertainty. (2) This section will explore the digital use cases your site has implemented since 2020 to support workforce development and engagement in the face of economic uncertainty.

1. Since 2020, 75% of Lighthouses have implemented an advanced use case against each one of five workforce priorities

■ Developing ■ Advanced

Digital use cases deployed by lighthouses in support of key workforce priorities, average # of use cases deployed per site¹



Overall, Lighthouses take a **holistic approach to their workforce**
75% have an advanced or developing use case in **all** workforce priority areas

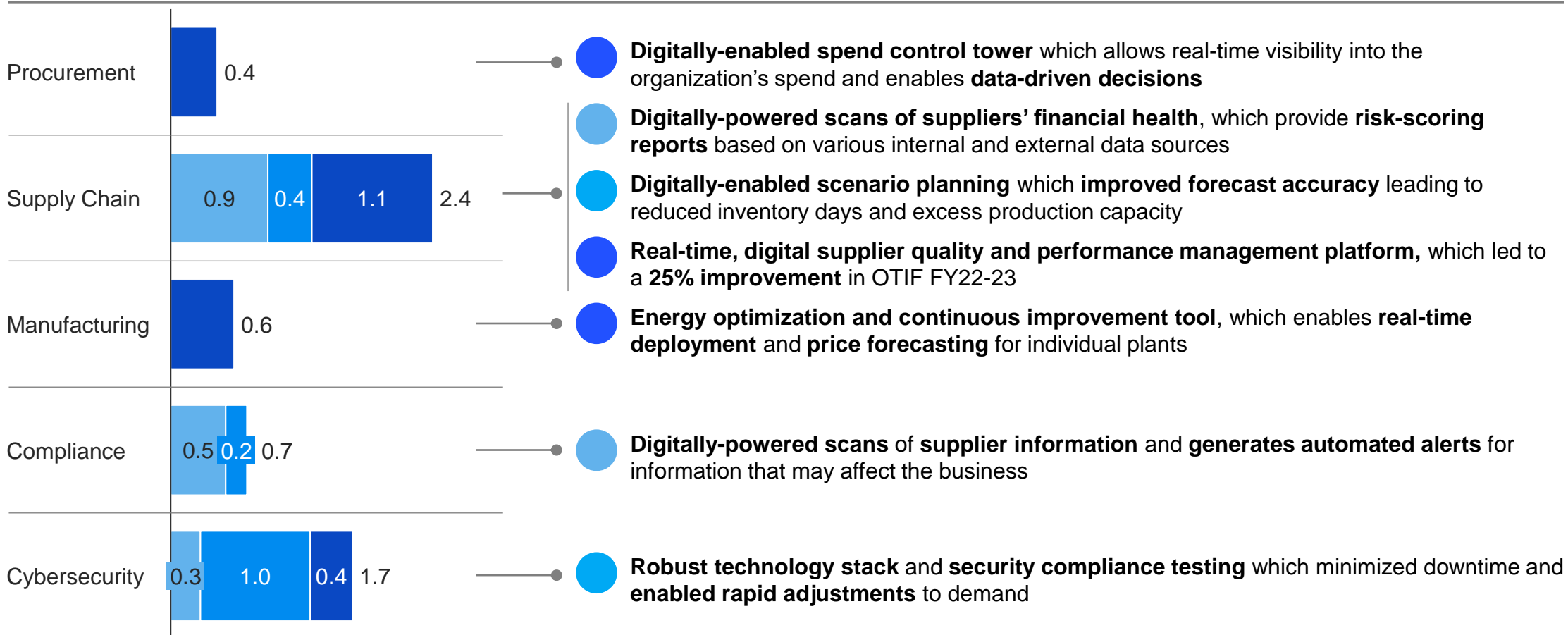
1: n=383, number of Lighthouse company responses (n=30 companies)

Original question(s): This section will explore the digital use cases your site has implemented since 2020 to build resilience in the face of economic uncertainty. What is the maturity of digital use cases you have implemented across each strategic action? If no digital use case is implemented, please select "N/A."

2. Since 2020, Lighthouses have implemented an average 5 resilience use cases, with a focus on supply chain management and cybersecurity

Resilience-focused use cases implemented by Lighthouses, avg # of 'advanced' use cases per respondent¹

■ Proactive Visibility ■ Active Mitigation
■ Risk Responsiveness



n=150, number of Lighthouse company responses (n=26 companies)

Original question(s): This section will explore the digital use cases your site has implemented since 2020 to build resilience in the face of economic uncertainty. What is the maturity of digital use cases you have implemented across each strategic action? If no digital use case is implemented, please select "N/A."

3. The use cases that Lighthouse sites implemented realize 10-30% improvements across productivity, sustainability, agility and cost

Capability domain	KPI category	Average impact ¹	Top use cases	Most common technologies
Asset Management	Productivity	<ul style="list-style-type: none"> ↑ 10 – 30% OEE ↑ 10 – 20% Factory output 	<ul style="list-style-type: none"> • Next generation lights-out assembly • Real-time OEE boosting platform • Predictive maintenance 	IIoT automation and real-time control
	Resource & Process Management Productivity Sustainability	<ul style="list-style-type: none"> ↑ 15 – 30% Factory output ↓ 10 – 30% Energy consumption 	<ul style="list-style-type: none"> • Facilities & energy management • Yield analytics / process optimization • Real-time process control 	IIoT automation and real-time control
Quality	Productivity	<ul style="list-style-type: none"> ↑ 25 – 30% Labor productivity 	<ul style="list-style-type: none"> • AI-powered vision inspections • In-process traceability and predictive modelling 	AI / ML-based analytics
	Cost	<ul style="list-style-type: none"> ↓ 20 – 60% Quality cost 		
Workforce Enablement	Productivity	<ul style="list-style-type: none"> ↓ 15 – 20% Non-value-added tasks 	<ul style="list-style-type: none"> • Connected worker platform enabling shopfloor collaboration • AI-enabled skill building / training 	Visualization tools (e0g0, BI, Tableau)
		<ul style="list-style-type: none"> ↑ 5 – 10% OEE 		
Supplier connectivity	Productivity	<ul style="list-style-type: none"> ↑ 20 – 50% Procurement efficiency 	<ul style="list-style-type: none"> • E2E AI-enabled supplier quality management on cloud • E-kanban supplier delivery system 	AI / ML-based analytics
	Cost	<ul style="list-style-type: none"> ↓ 40 – 50% Quality cost 		
Integrated planning	Agility	<ul style="list-style-type: none"> ↓ 30 – 70% Lead time 	<ul style="list-style-type: none"> • ML-enabled demand planning & replenishment • E2E Agile Supply Chain Control Tower 	IIoT automation and real-time control
		<ul style="list-style-type: none"> ↑ 15 – 30% On-time delivery 		
Customer connectivity	Cost	<ul style="list-style-type: none"> ↓ 20 – 50% Quality cost 	<ul style="list-style-type: none"> • Self-service B2B portal with real time use behavior analytics • Customer usage field analytics 	Customer Portals
Fulfilment, logistics, & material handling	Productivity	<ul style="list-style-type: none"> ↓ 15 – 60% Operating cost 	<ul style="list-style-type: none"> • Intelligent dispatching / call-off systems • Fully automated inbound logistics • Lights-out automated warehouse 	IIoT automation and real-time control
	Agility	<ul style="list-style-type: none"> ↓ 25 – 50% Inventory 		
Procurement	Productivity	<ul style="list-style-type: none"> ↓ 25 – 30% Operating cost 	<ul style="list-style-type: none"> • Analytics-driven predictive procurement • Digital vendor ecosystem with spend intelligence engine 	RPA / workflow automation
	Agility	<ul style="list-style-type: none"> ↓ 5 – 10% Inventory 		

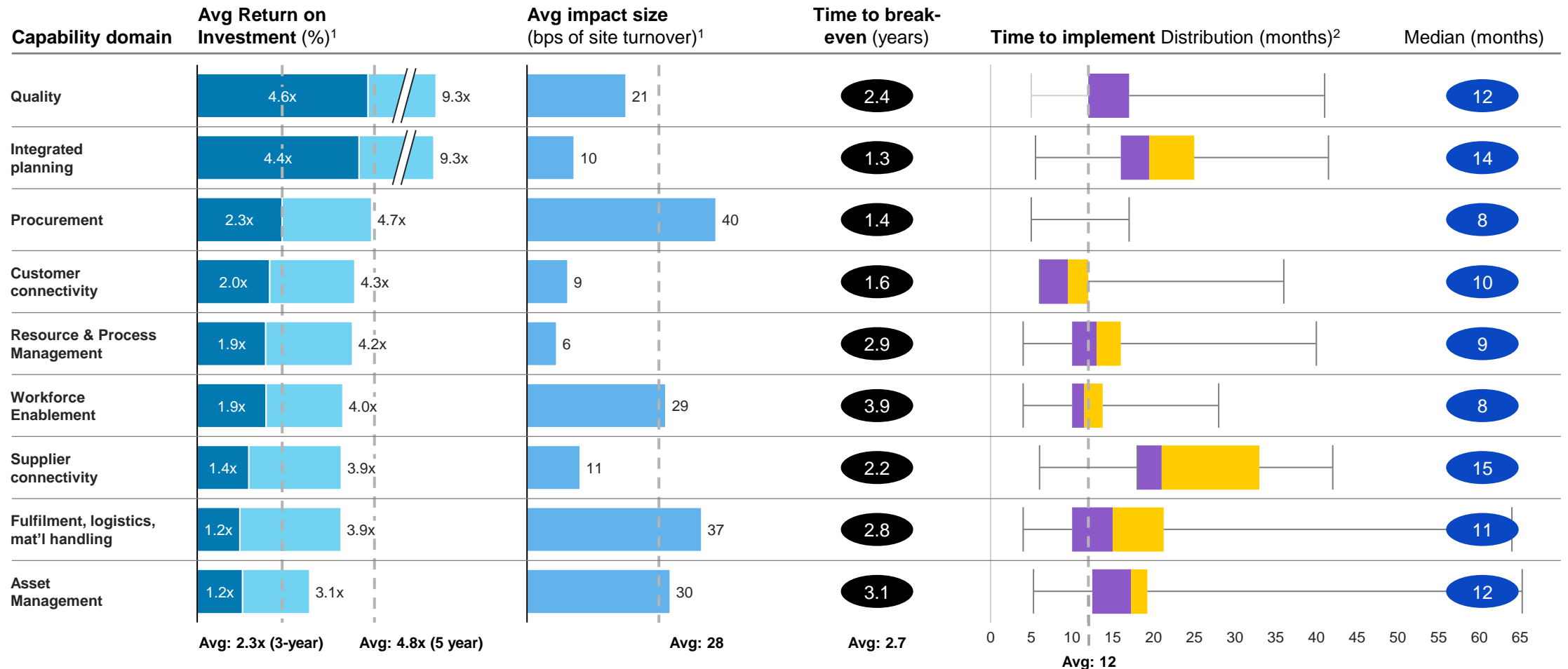
1. n=48, number of Lighthouse site responses (n=4 incomplete responses excluded)

Original question: For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation

3. On average, Lighthouse sites realize 4-5x ROI over 5 years from their use cases, which take 10-20 months to implement

'Smart factory' (material handling, asset and resource mgmt.) and procurement use cases typically have largest impact

■ 3-year period ■ 5-year period

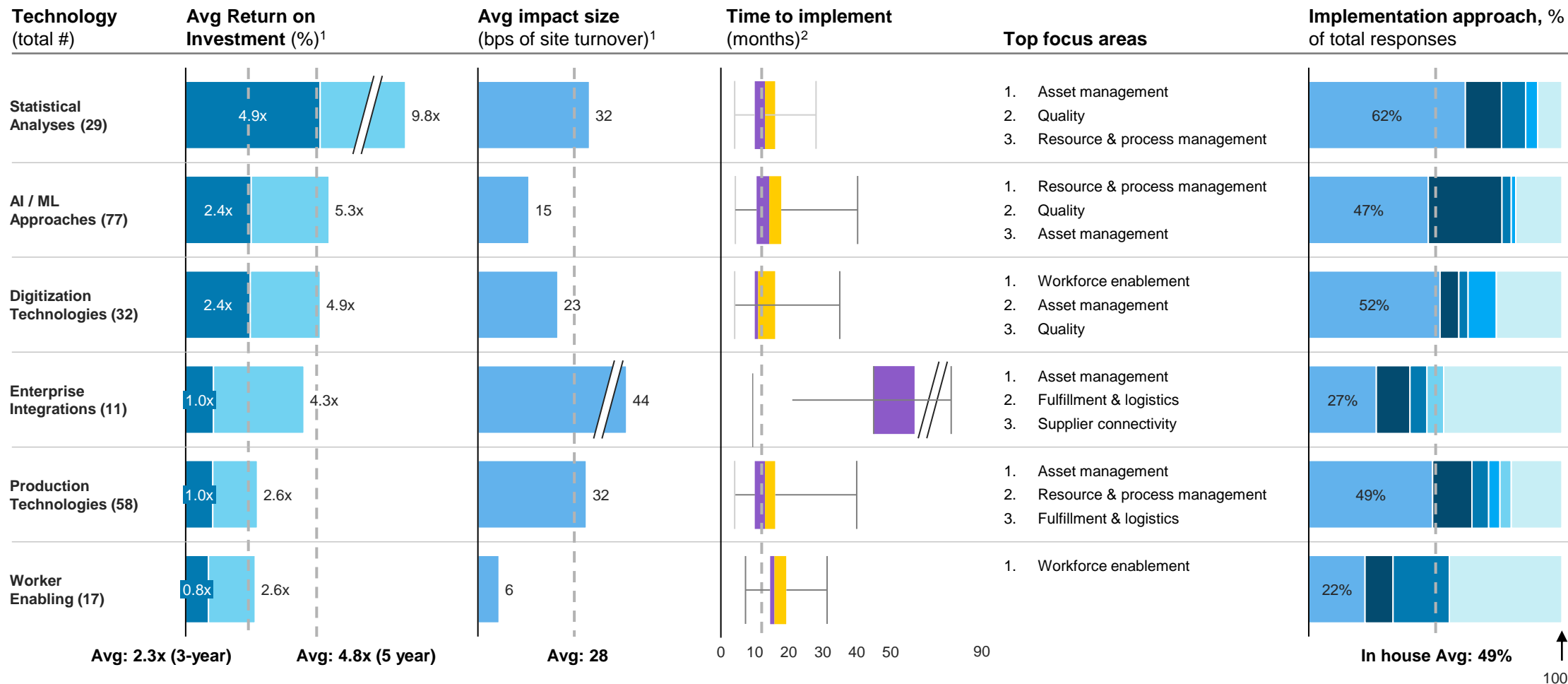


1. n=109 use cases across n=52 Lighthouse sites with financial information shared in full; 2. n=208 use cases across n=52 Lighthouse sites with financial information shared in full

Original question: For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation: (1) Time from design to full deployment (in months) (2) Approximate investment (\$K USD) (3) Approx annual impact (\$K USD)

3. 49% of Lighthouse sites develop advanced technologies in-house, implementing use cases in 11 months with an average 3.9x ROI

■ 3 year period ■ 5 year period ■ In-house ■ Joint Venture ■ Licensed ■ Acquired ■ Academia ■ Combination



1. n=100, number of Lighthouse site responses (n=124 excluded for data incompleteness); 2. n=192, number of Lighthouse site responses (n=32 excluded for data incompleteness)

Original question: For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation: (1) Time from design to full deployment (in months) (2) Approximate investment (\$K USD) (3) Approx annual impact (\$K USD)

66% of Lighthouses have made significant investments in digital, of which 88% have plan to continue to invest

Past and future plans to invest in digital, # of responses

		Future plans to invest		
		No plans to invest in digital	Plans to somewhat invest in digital	Plans to significantly invest in digital
Past investments	Major investments in digital made	1	10	10
	Minor investments in digital made	1	5	2
	Supply chain was already digitized	1	1	-

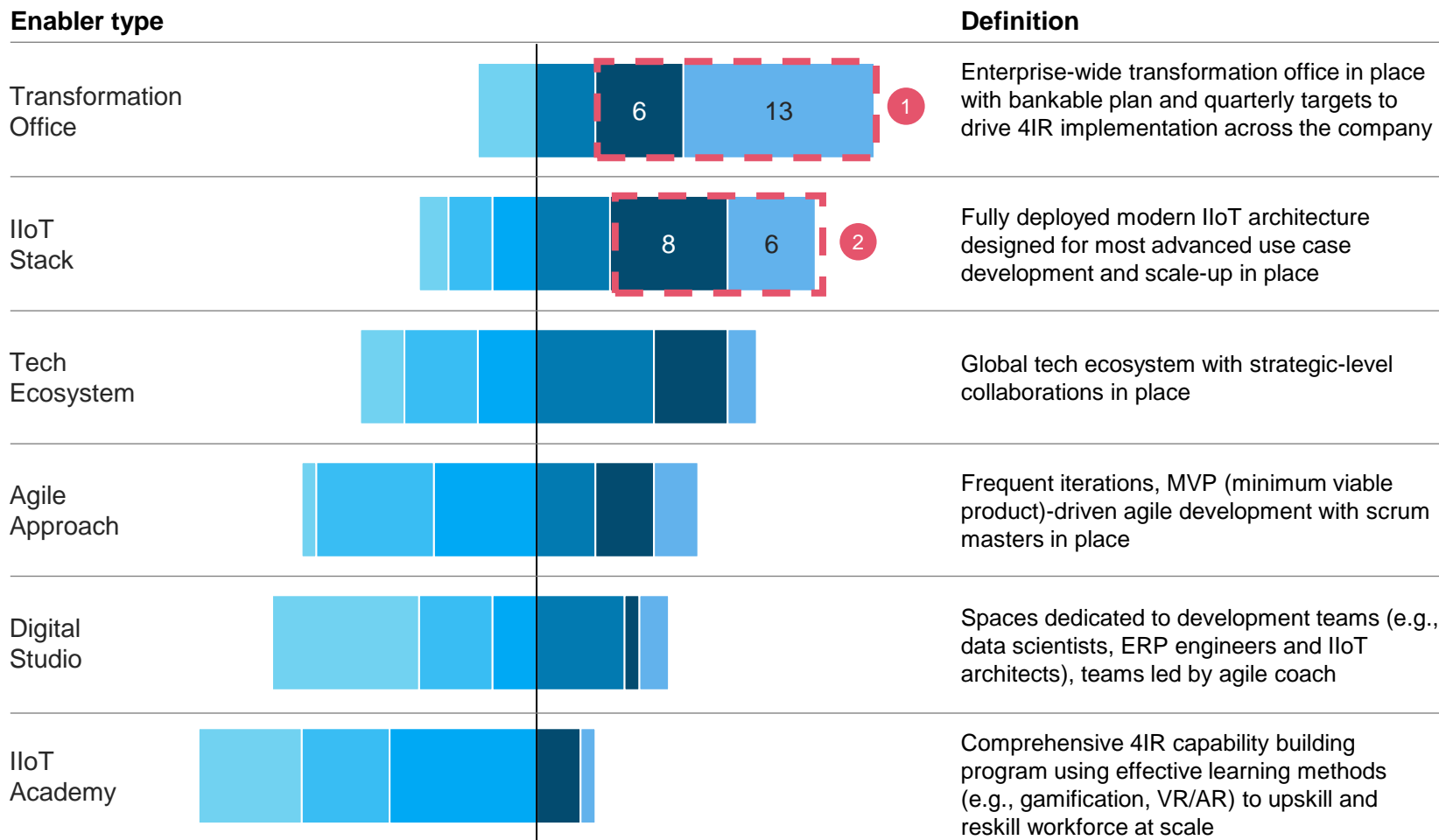
n=30, number of Lighthouse company respondents

Original question(s): 1. Have you invested in digital technologies for your supply chain in the past two years? Please select one answer.
 2. Are you considering further increasing investment in digital technologies for your supply chain? Please select one answer.

61% of Lighthouses rank TO and IIoT Stack as the top 2 enablers for achieving impact

Top ranked digital enablers, # responses

Least important 6 5 4 3 2 1 Most important



Insights

- 1 70% name **Transformation Office** as a top 2 enabler
- 2 52% name their **IIoT tech-stack** as a top 2 enabler

These enablers are **accelerating deployment time** for new use cases

- ~80% of Lighthouses said they can now deploy new uses cases in **6 months or less**, and
- ~30% said they can deploy new use cases in **3 months or less**

n=27, number of Lighthouse company responses

Original question: Please click and drag to rank which enablers have been most critical to achieving impact across your lighthouse locations (1 being the highest)

Lighthouses typically hire for about 25 new digital roles per 1,000 Factory FTE to enable transformation

4IR Transformation capabilities added by domain, # FTEs added per 1,000¹

Less FTE More FTE

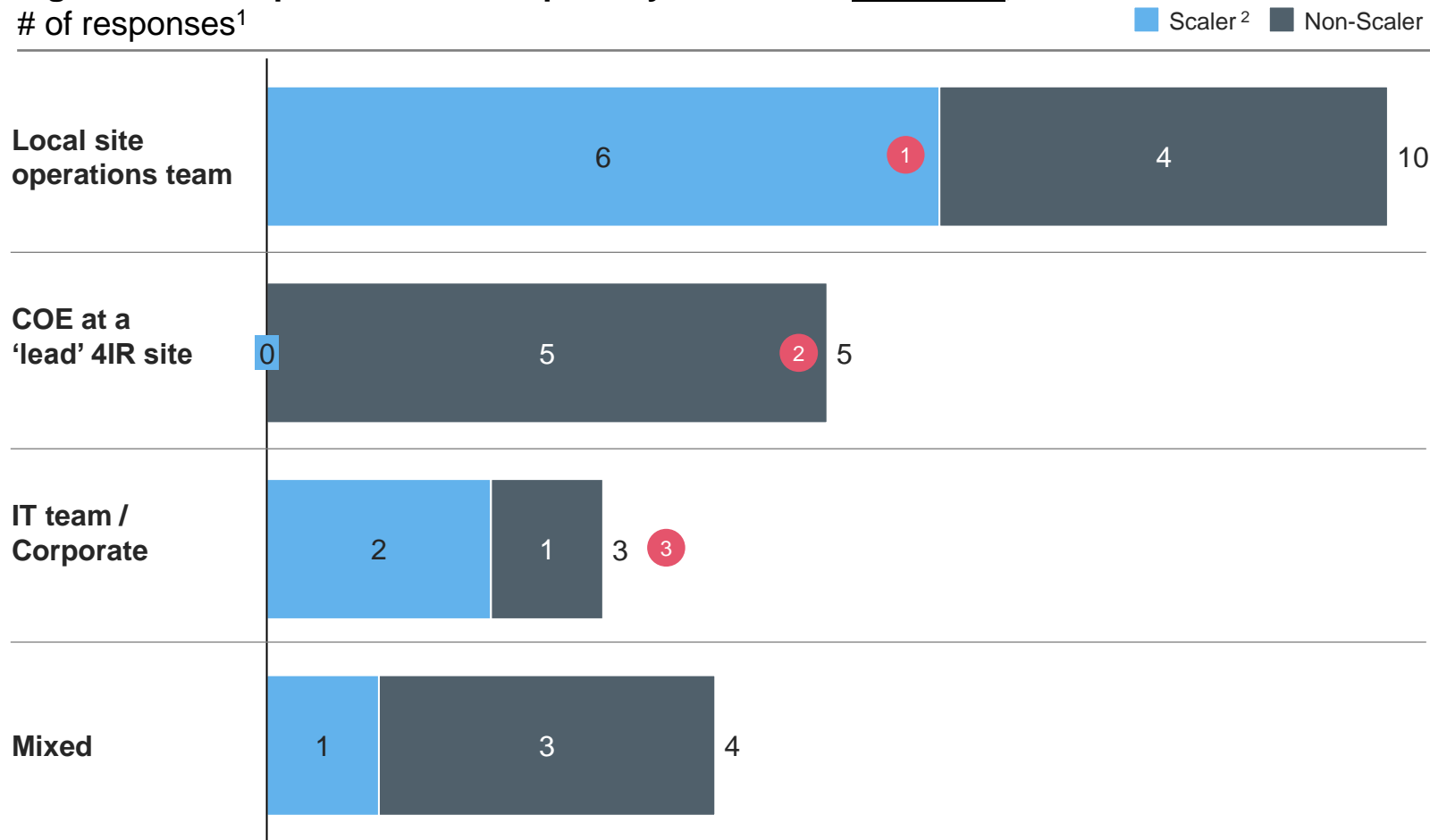
	Business					Technical						Other	Total
	Business owner	Product managers	Business translators	Transformation leaders	Agile coaches	Sub-total	Data scientist	Cyber-security	Automation specialist	Data engineers	Sub-total		
Local site operations team	0.7	1.1	0.6	2.4	0.5	5.3	1.1	0.8	2.3	0.9	5.1	0.6	11.1
IT team / Corporate	0.1	0.9	0.1	0.2	0.2	1.5	0.9	0.9	0.4	0.5	2.7	0.0	4.1
COE at 'lead' 4IR site	0.6	0.9	1.4	1.2	0.6	4.7	2.9	0.5	1.0	1.1	5.5	0.0	10.2
Other	0.1	0.4	0.0	0.1	0.0	0.6	0.1	0.3	0.0	1.1	1.5	0.0	2.1
Total	1.5	3.3	2.0	3.9	1.2	11.9	4.9	2.5	3.7	3.6	14.7	0.7	27.5

n=30, number of Lighthouse company responses with >150 declared FTEs

Original question: What are the roles that you have added over the past 2-3 years to enable digital transformation across your lighthouse site(s) and corporate teams? Please input the # of FTE hired to support digital transformation specific to your lighthouse site(s), based on what function they were hired into

Most lighthouses place new hires on-site, particularly ‘Advanced Scalers’

Lighthouse companies based on primary location of hired FTE,
of responses¹



Insights

Dominant areas are determined by the **largest % share of FTE** added to support the transformation

- 1 **Scalers** in particular are adding FTE to **onsite** locations and addressing **site-specific capability gaps**
- 2 **Non-scalers**, on the other hand, have added FTE to **individual COEs** or transformation centers (e.g., HQ), and **deployed these resources** in support of other locations
- 3 **The minority of companies take an IT-led approach**, often due to high variability of IT systems and/or manufactured products across the production network

1. n=22, number of Lighthouse company responses with >150 declared FTEs (n=8 excluded for data incompleteness); 2. Scalers are Lighthouses that have scaled use cases to 3 or more sites (n=9)

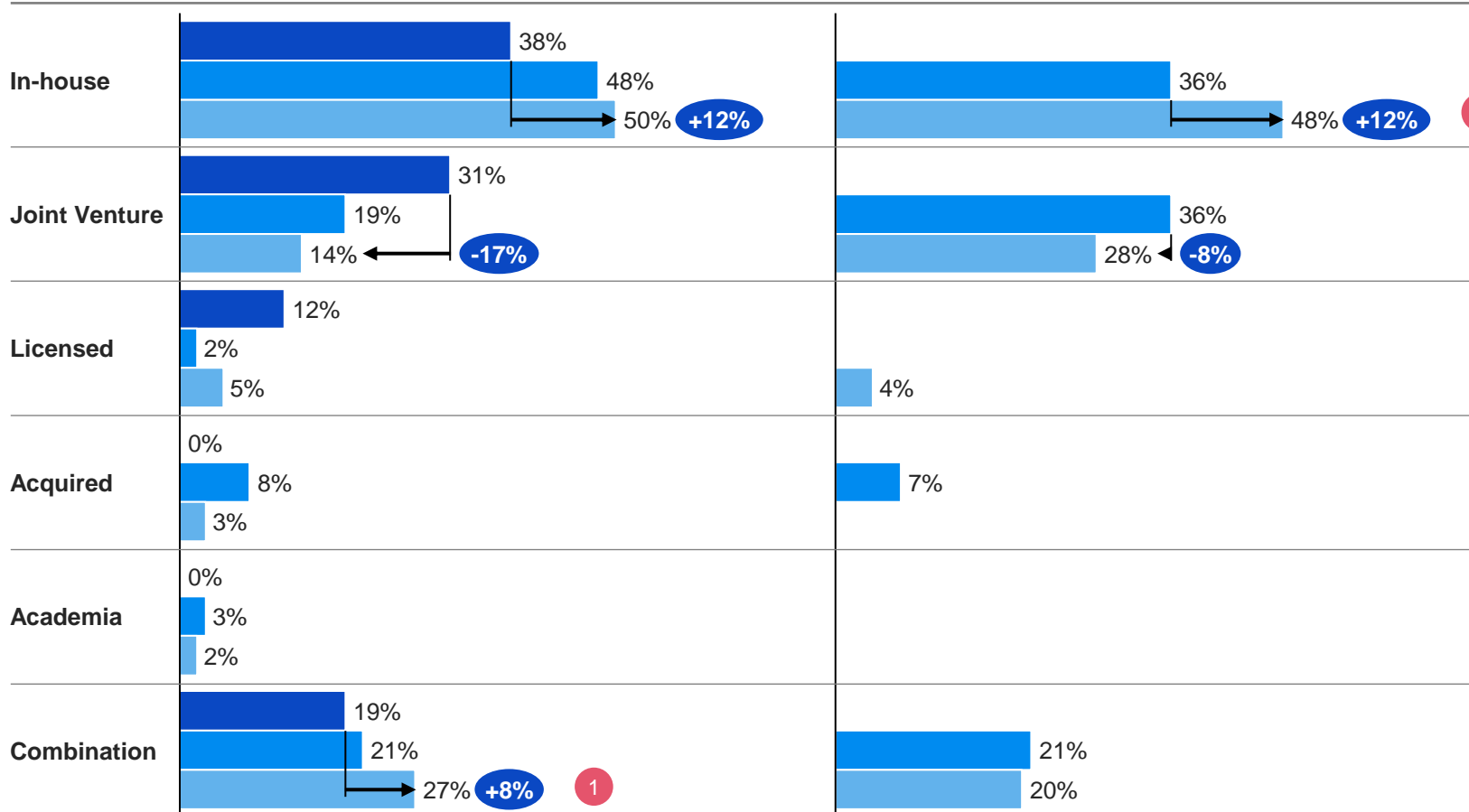
Original question: What are the roles that you have added over the past 2-3 years to enable digital transformation across your lighthouse site(s) and corporate teams? Please input the # of FTE hired to support digital transformation specific to your lighthouse site(s), based on what function they were hired into

50% of Lighthouses sites are now taking an in-house approach, up 7% vs. 2020

■ Waves 1-3 (2018-2019) ■ Waves 4-6 (2020-2021) ■ Waves 8-10 (2022-2023)

Implementation approach by Wave (all use cases)¹, % of total²

AI Models Implementation approach by Wave, % of total³



Insights

Lighthouses are building **in-house capabilities**, moving away from **joint ventures** towards **combo-approaches**

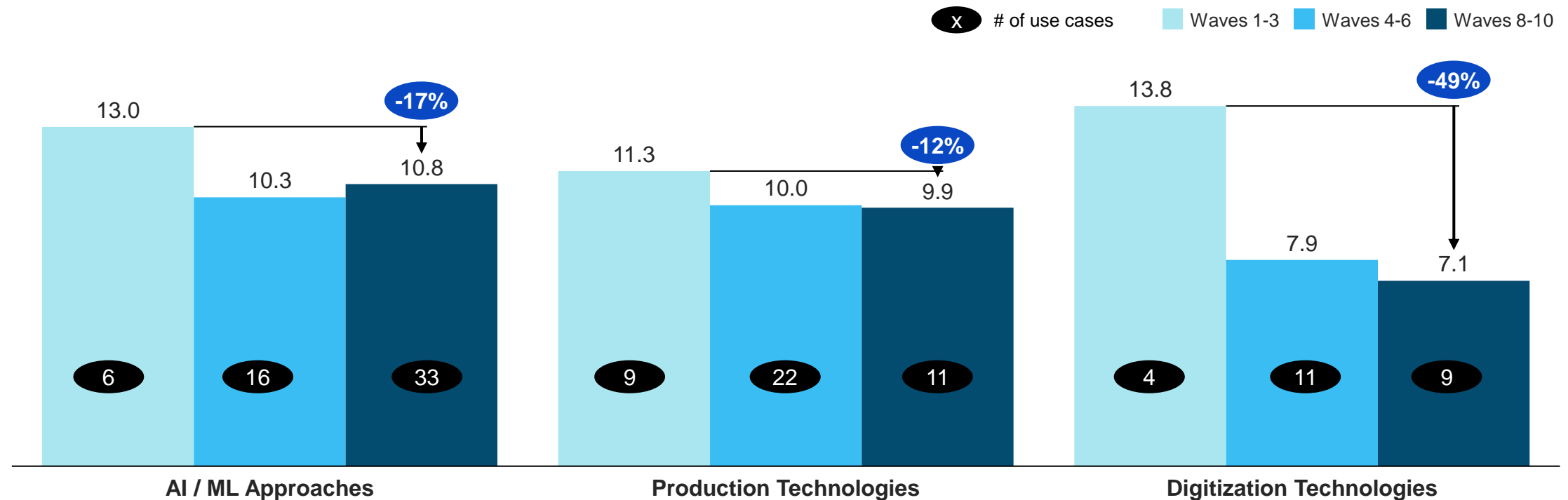
- 76%** of all combination approaches involve **in-house development**, supplemented by a single other method (e.g., **JV, licensed**)
Over time, lighthouses have added capability to design for in-house customizations on externally developed applications
- Share of in-house development continues to increase**, driven in part by a 12p.p. increase in-house capabilities to develop analytical AI models, which make up **25%** of total use cases
This trend is likely to **continue** as Lighthouses leverage these capabilities to **scale learnings and skills** across the production **network**

1. Wave 7 was excluded to remove COVID outliers (i.e., AI Models = 60% in-house); 2. n=153, number of Lighthouse company responses; 3. n=39, number of Lighthouse company responses; excludes Waves 1-3 (n=6, limited data)

Original question: For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation

Lighthouse sites have accelerated implementation speeds for advanced use cases by 26% on average

Advanced use case implementation speed, average months to implement by Wave¹



AI / ML deployment speed is **improving**, but **remains high due** to time required to build and train new models

Speed to deploy production technology (e.g., robotics) is **improving**, but **remains high** due to procurement time and implementation planning requirements (e.g., shutdowns for line overhauls)

Digitization speed has increasingly accelerated, as Lighthouses increase in data maturity, availability, and connected IT/OT infrastructure across the shop floor

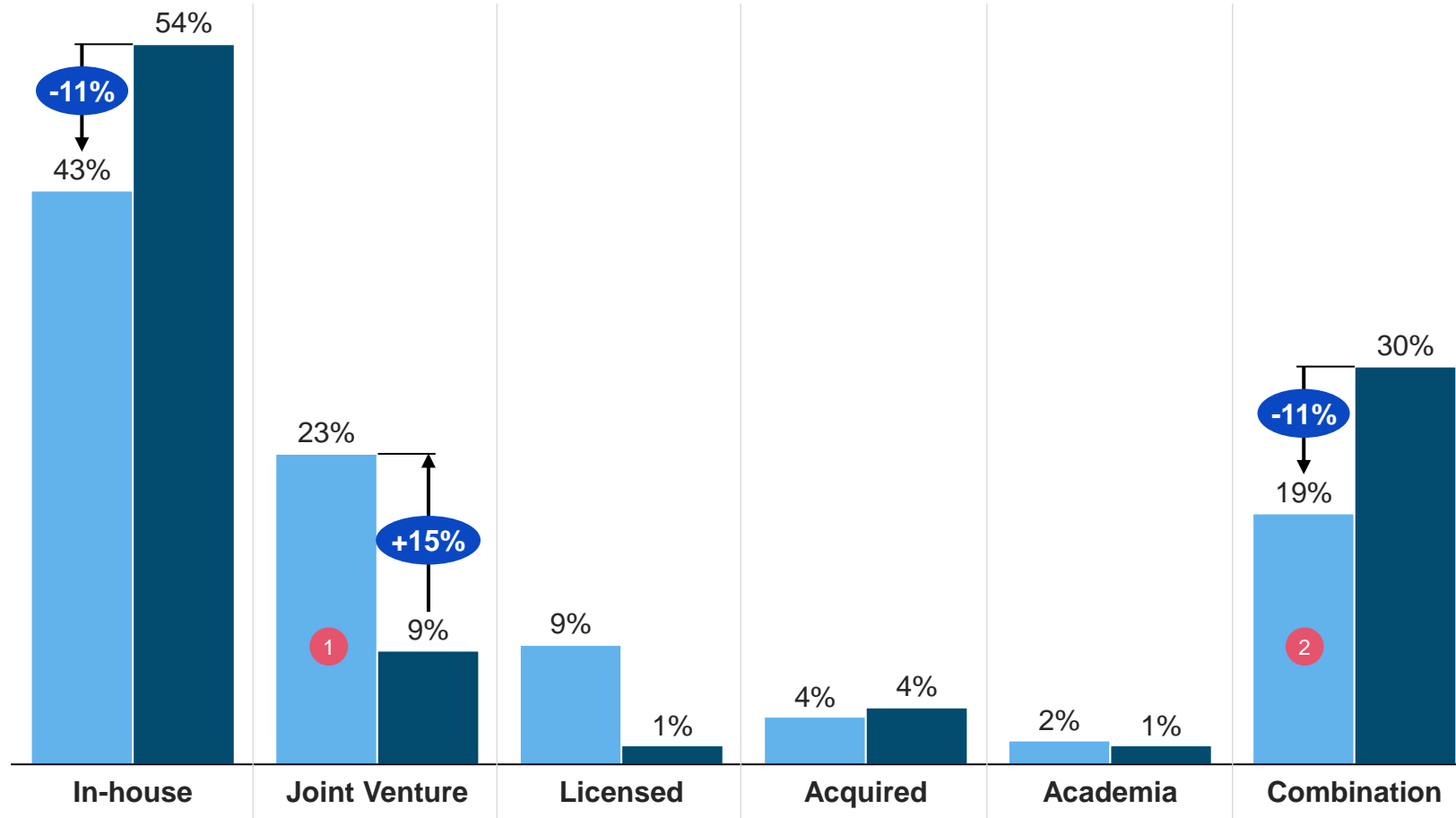
1. n=121, number of Lighthouse company responses (n=24 excluded for Wave 7 COVID outliers)

Original question: For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation: (1) Time from design to full deployment (in months) (2) Approximate investment (\$K USD) (3) Approx annual impact (\$K USD)

Scalers stick with one approach, 11% less using combination of approaches than non-scalers

■ Scaler² ■ Non-Scaler

Implementation approach by 4IR technology and network scale, % of total responses¹



Insights

Scalers do less **combination** approaches than **non-scalers**, sticking to either **in-house** or **JV**

Scalers are more effectively leveraging the **technology ecosystem** and bringing on third parties than non-scalers:

- 1 **23%** of scalers take a JV approach, **+15%** more than non-scalers
- 2 **71% of combinations** are **in-house + licensed** or **in-house + JV** (vs 52% for non-scalers)

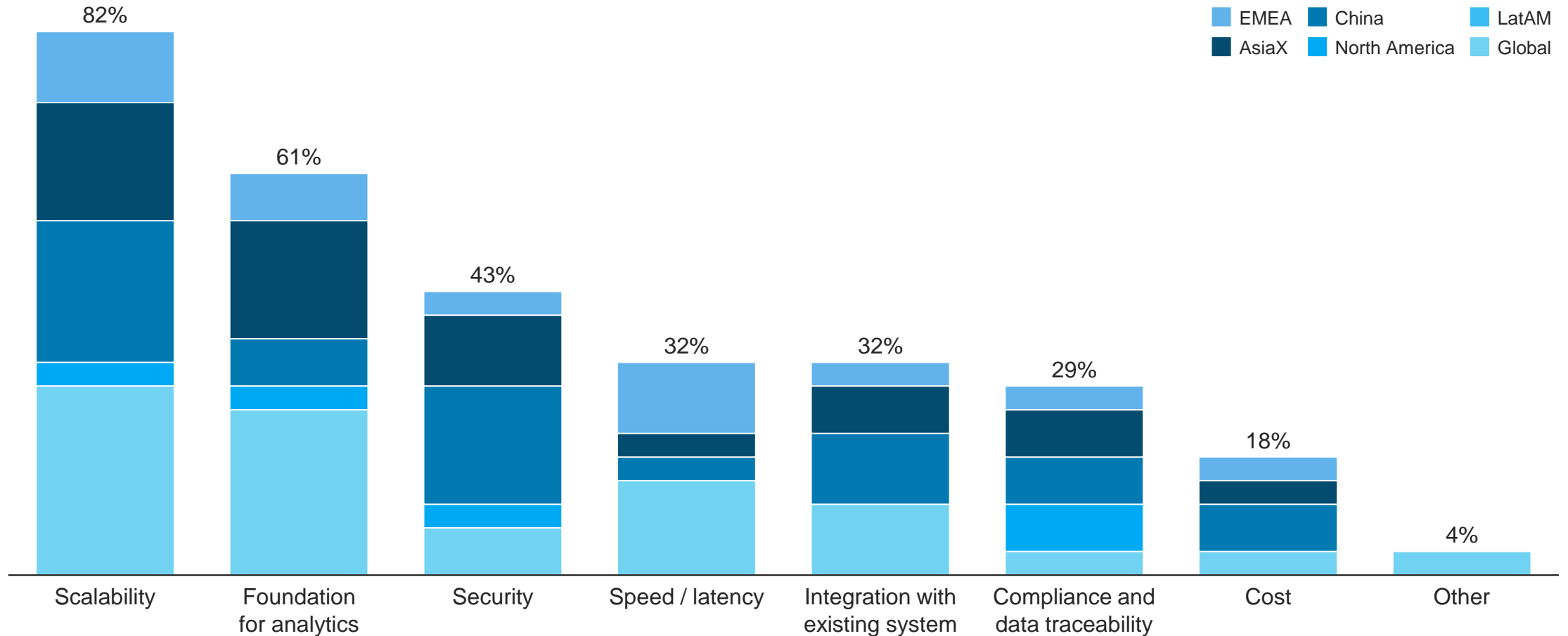
For scalers, these **partnerships** account for **14%** of all use case **implementation approaches**

1. n=181, number of Lighthouse company responses (n=31 excluded for data incompleteness); 2. Scalers are companies that have scaled 4IR to 3 or more sites that have been recognized as Global Lighthouses

Original question: For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation

82% of Lighthouses are now designing with scale in mind, citing it as a key consideration for any new technology

Top factors influencing data strategy, % of responses by region¹



1. n=150, number of Lighthouse company responses

Original question(s): (1) What were the top three factors that influenced your decisions on data strategy including management, storage, and infrastructure? Please click and drag to rank-order these options (2) For the top 5 use cases you previously submitted to the expert panel, please provide insight on the approach you took to technology development and implementation: (3) Time from design to full deployment (in months) (4) Approximate investment (\$K USD) (3) Approx annual impact (\$K USD)

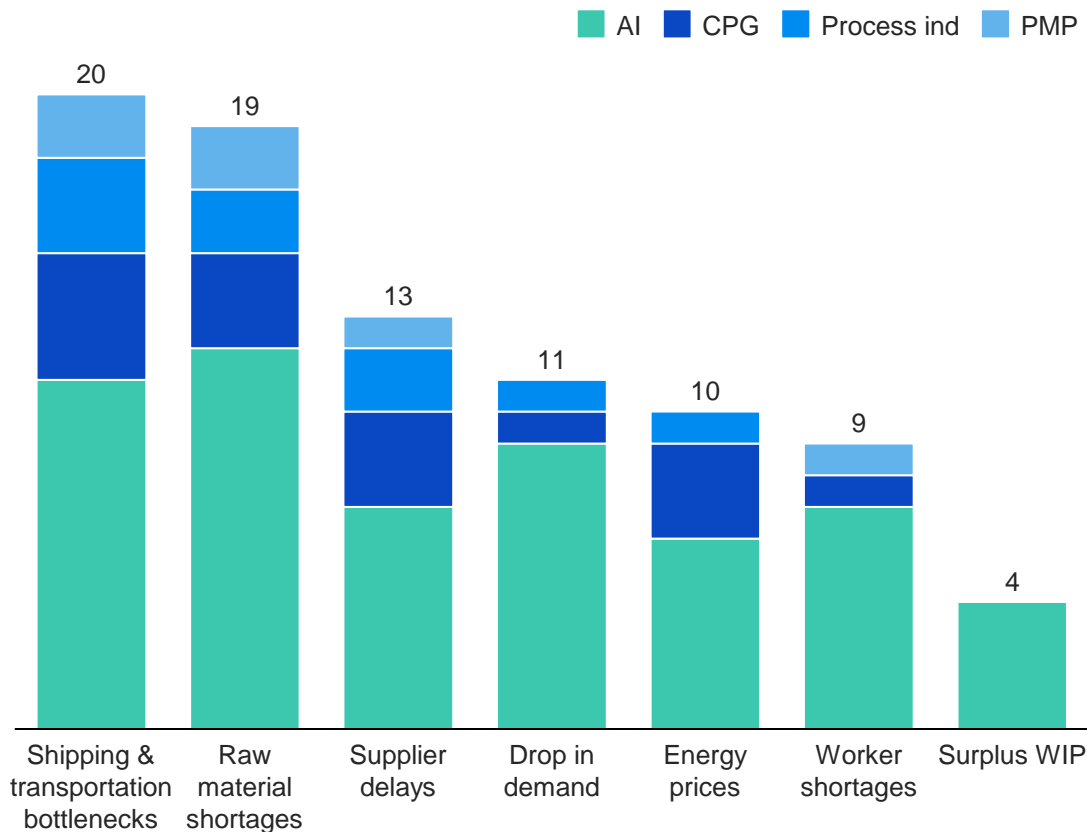
Appendix

Appendix: Company-level survey additional insights

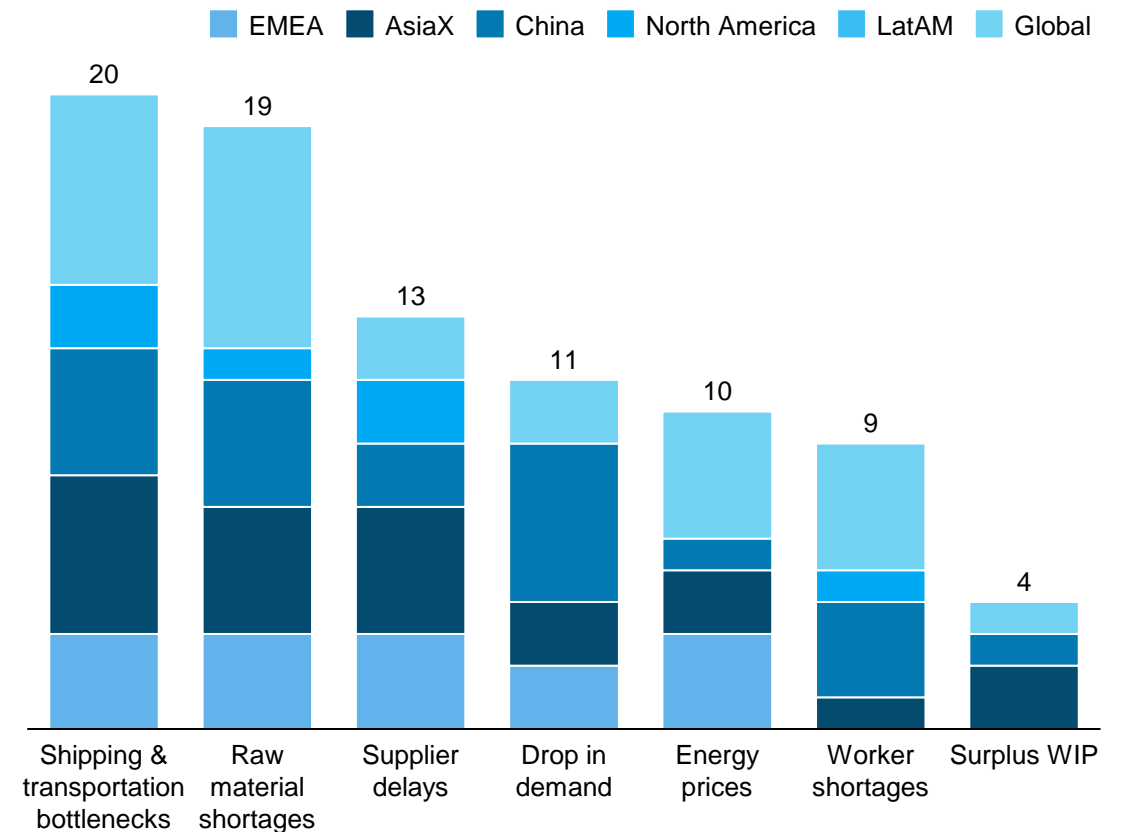
70% of Lighthouses have faced significant supply chain and energy price risks

Business needs solved by 4IR technologies

By industry, # responses¹



By region, # responses



1. n=86, number of Lighthouse company responses

Original question: What were the main supply chain risks or shortages you experienced during the last 2 years due to the various supply chain challenges (COVID-19 crisis, semiconductor shortage, conflict in Ukraine, etc.) ? Please select your top 3 answers

By 2022, 65% Lighthouses were already dual-sourcing and increasing inventory

Strategic actions, # responses¹

Business risks, # responses	Strategic actions, # responses ¹											Sub-total
	Dual sourcing of raw materials	Increasing inventory of critical	Capacity enhancement	Region-alizing the supply chain	Near-shoring of suppliers	Backing-up production sites	Change of mode mix	Near-shoring of production	Other (please explain)	Re-design of ware-housing network	Increasing outsourcing of ware-housing	
Shipping & transportation bottlenecks	15	12	12	12	10	8	7	5	2	2	3	88
Raw material supply shortages	14	14	14	10	8	7	7	2	2	3	1	82
Suppliers delays and underperformance	11	9	7	8	6	4	4	3	2	1	3	58
Worker shortages and attrition	7	6	6	7	4	5	3	2	1	1	0	42
Drop in demand	5	9	8	5	3	1	3	2	1	1	1	39
Energy price increases and volatility	5	3	7	5	3	3	2	0	2	1	1	32
Surplus WIP & final inventory beyond storage capacity	1	3	3	1	1	0	1	1	1	0	0	12
Sub-total	58	56	57	48	35	28	27	15	11	9	9	

In a recent survey of manufacturers, only **19%** reported implementing **dual sourcing strategies**, and **39%** reported **increasing inventory**

(Source: McKinsey Supply Chain Pulse Survey, 2023)

1. n=353, number of Lighthouse company responses

Original question(s): 1. What were the main supply chain risks or shortages you experienced during the last 2 years due to the various supply chain challenges (COVID-19 crisis, semiconductor shortage, conflict in Ukraine, etc.)? Please select your top 3 answers. 2. Which of the following options (if any) have you already taken or initiated since the beginning of the COVID-19 pandemic to increase your supply chain resilience? Please select all that apply.

Over 50% of resilience use cases focused on operational and data challenges

Advanced Developing Nascent N/A

Category	Use case	Maturity, % of total responses ¹				100% =
Manufacturing	Energy optimization / demand management to mitigate price volatility	54	11	21	14	28
	Compliance and safety hotlines, including response automation	18	18	29	36	28
IT	Tech stack / robustness and compliance testing	46	36	0	18	28
	Cybersecurity issue reporting / automation	46	36	7	11	28
	Supplier permissions and controls process on IP sharing.	36	18	18	29	28
	Data security regulations mapping	25	39	11	25	28
Procurement	Just in case' purchasing enablement	25	25	21	29	28
	Digitally enabled spend control tower	14	39	18	29	28
Risk	Early warnings/disruption scans	25	32	21	21	28
	Digitally-enabled scenario planning	21	39	18	21	28
	Risk event forecasting	21	36	29	14	28
	Proactive supplier ESG metrics monitoring	21	32	29	18	28
Supply chain - management	Supplier quality and performance management	46	43	4	7	28
	Risk-informed category management (near-shoring, dual sourcing)	39	36	11	14	28
	Rapid supplier qualifications + onboarding	21	43	11	25	28
Supply chain - planning	Scanning for critical activity or news	25	43	11	21	28
	Digitally-powered, ongoing scans of supplier financial health	14	32	18	36	28
	Tier-n visibility for risk identification	11	36	29	25	28
	Supplier news scanning and alert systems	11	39	14	36	28
Financial	Digitally-powered, ongoing scans of supplier financial health	14	25	18	43	28
Other	Other	36	9		55	22

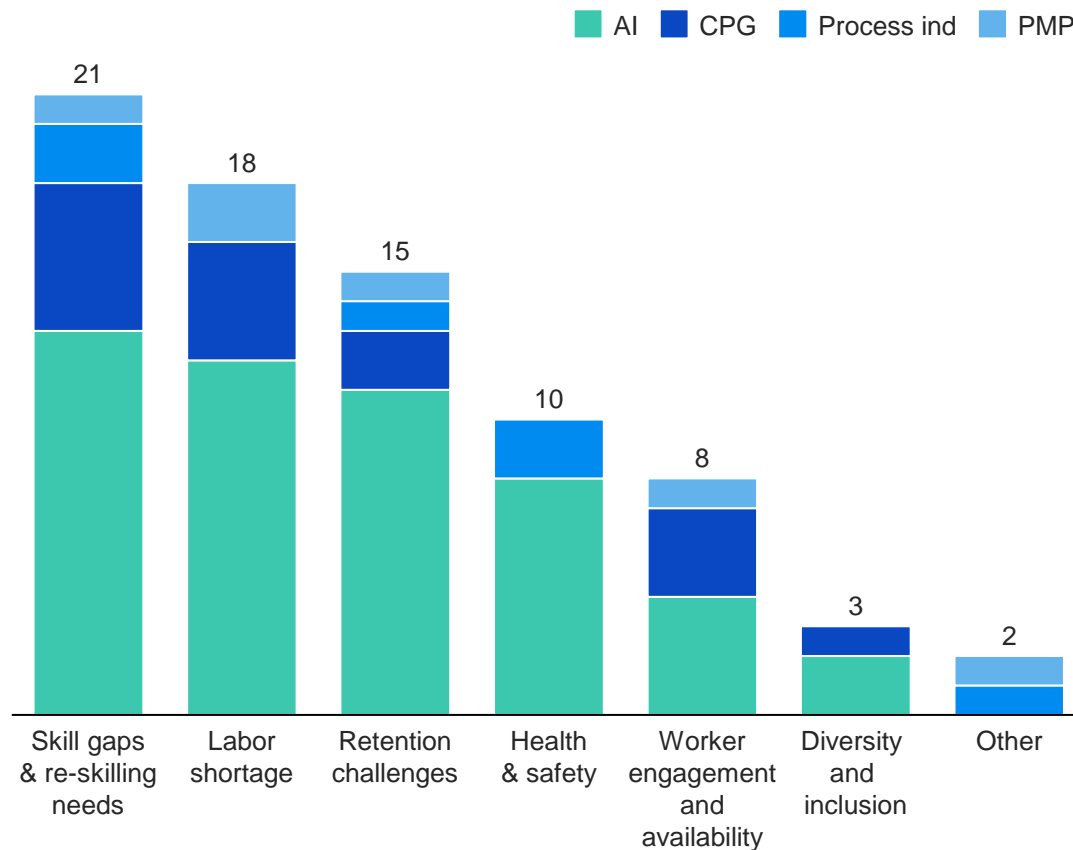
1. n=28, number of Lighthouse company responses

Original question(s): 1. What is the maturity of digital use cases you have implemented across each strategic action? If no digital use case is implemented, please select "N/A"
2. Select use cases to deep dive in next section. Please select up to 5 Highest Impact use cases

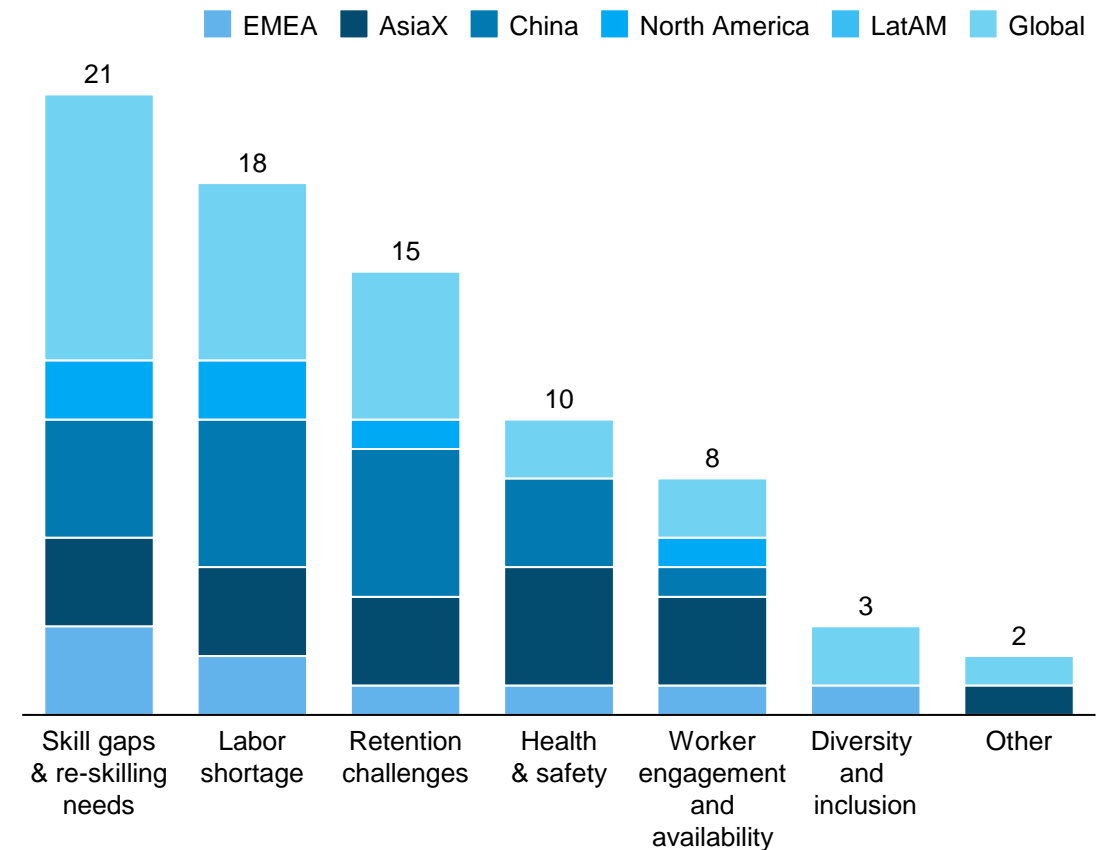
80% of Lighthouses reported skills gaps and shortages, including retention and worker engagement challenges

Workforce challenges

By industry, # responses¹



By region, # responses

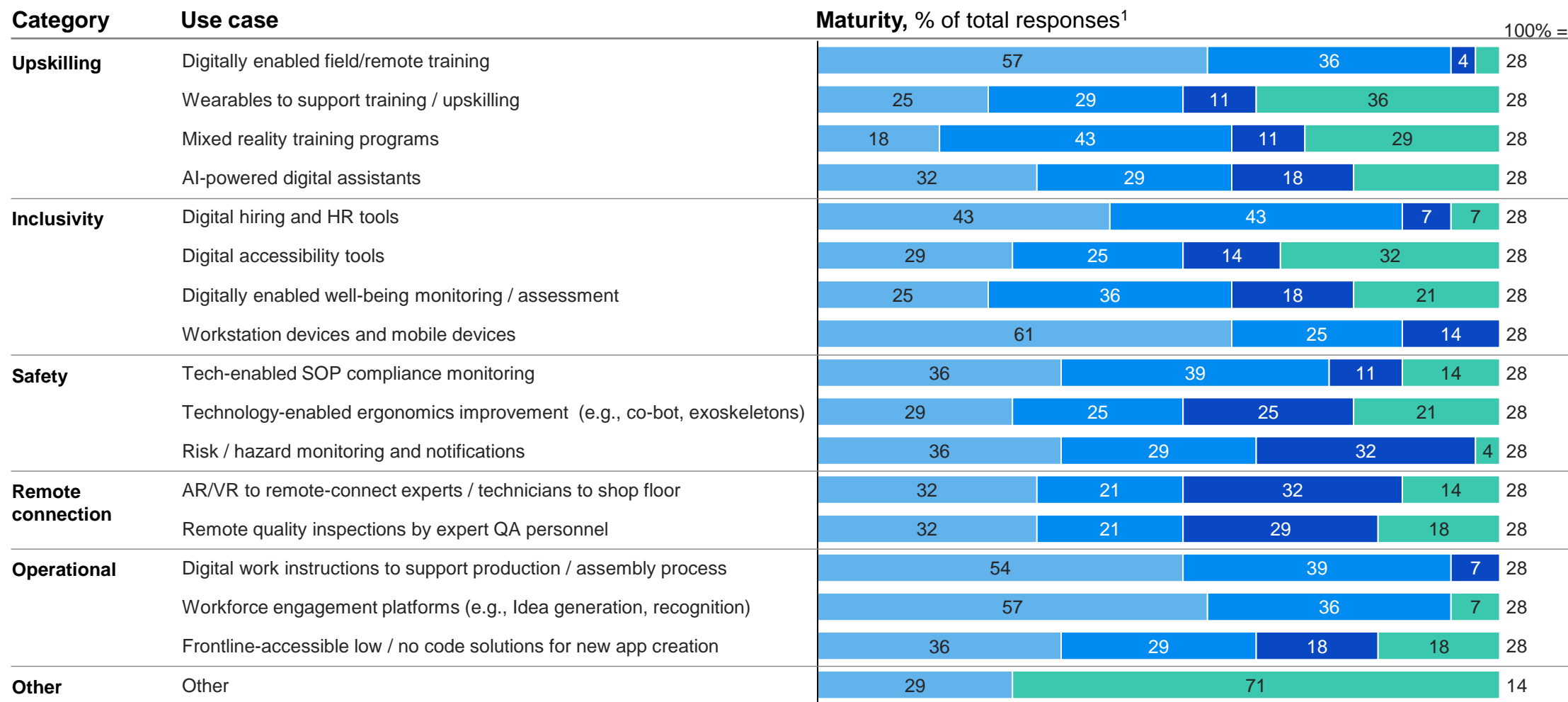


1. n=77, number of Lighthouse company responses

Original question: What were the main issues you experienced with your workforce during the last 2 years due to the various global events (COVID-19 crisis, conflict in Ukraine, etc.) or other reasons? Please select your top 3 answers

Over 50% of advanced and developing workforce use cases are focused on upskilling and inclusivity

Advanced Developing Nascent N/A



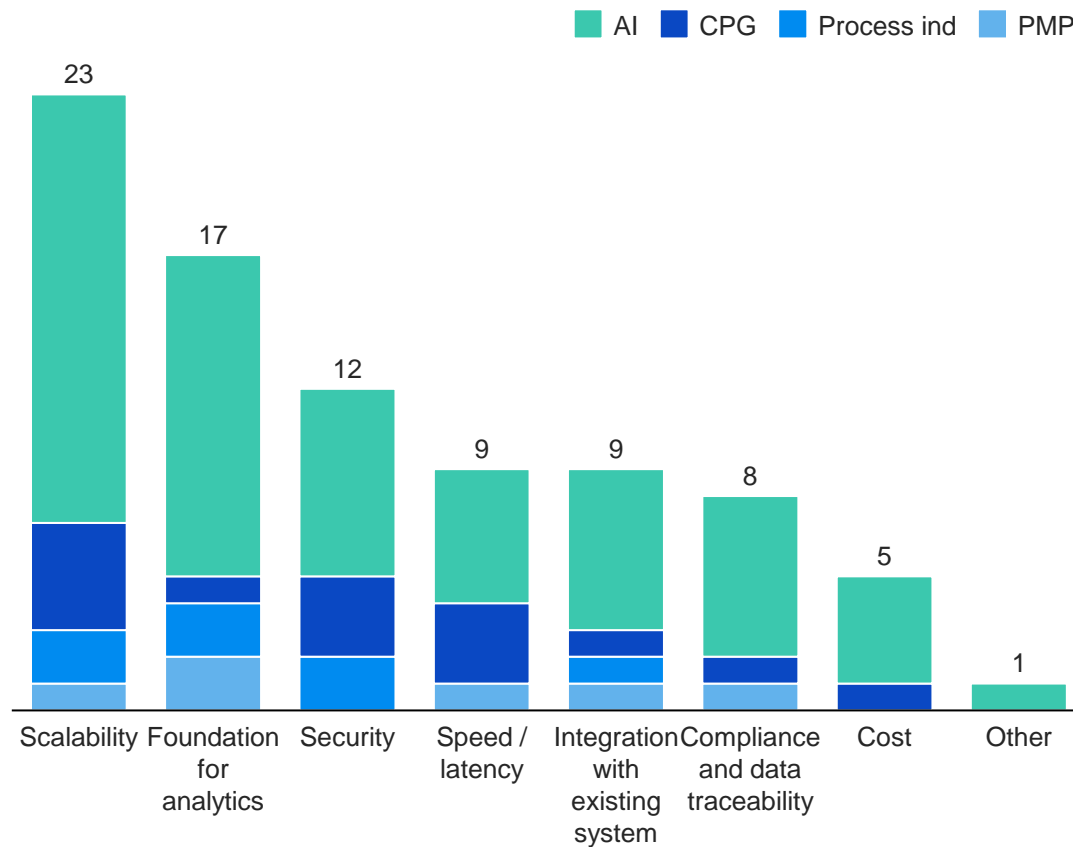
1. n=28, number of Lighthouse company responses

Original question(s): What is the maturity of digital use cases you have implemented for each strategic action? If no digital use case is implemented, please select "N/A"
 2. Select use cases to deep dive in next section. Please select up to 5 Highest Impact use cases

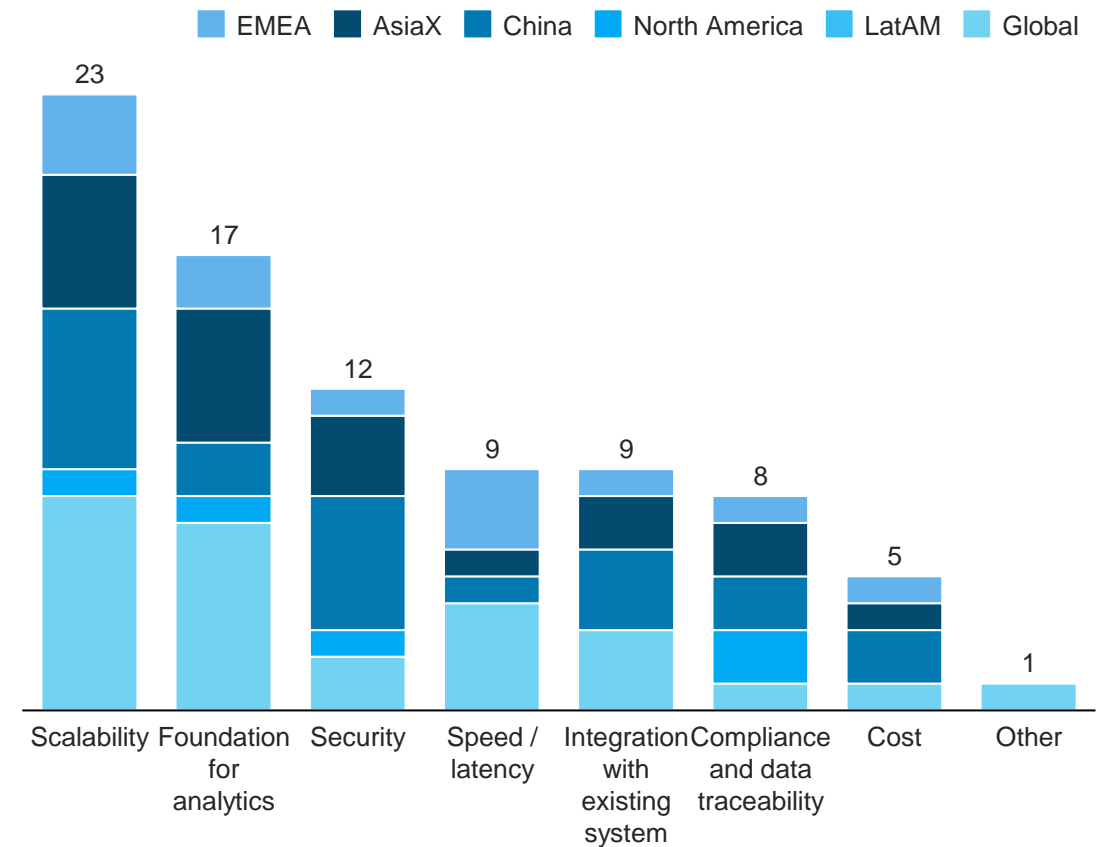
82% of Lighthouses are now designing with scale in mind, citing it as a key consideration for any new technology

Data strategy influencing factors

By industry, # responses¹



By region, # responses



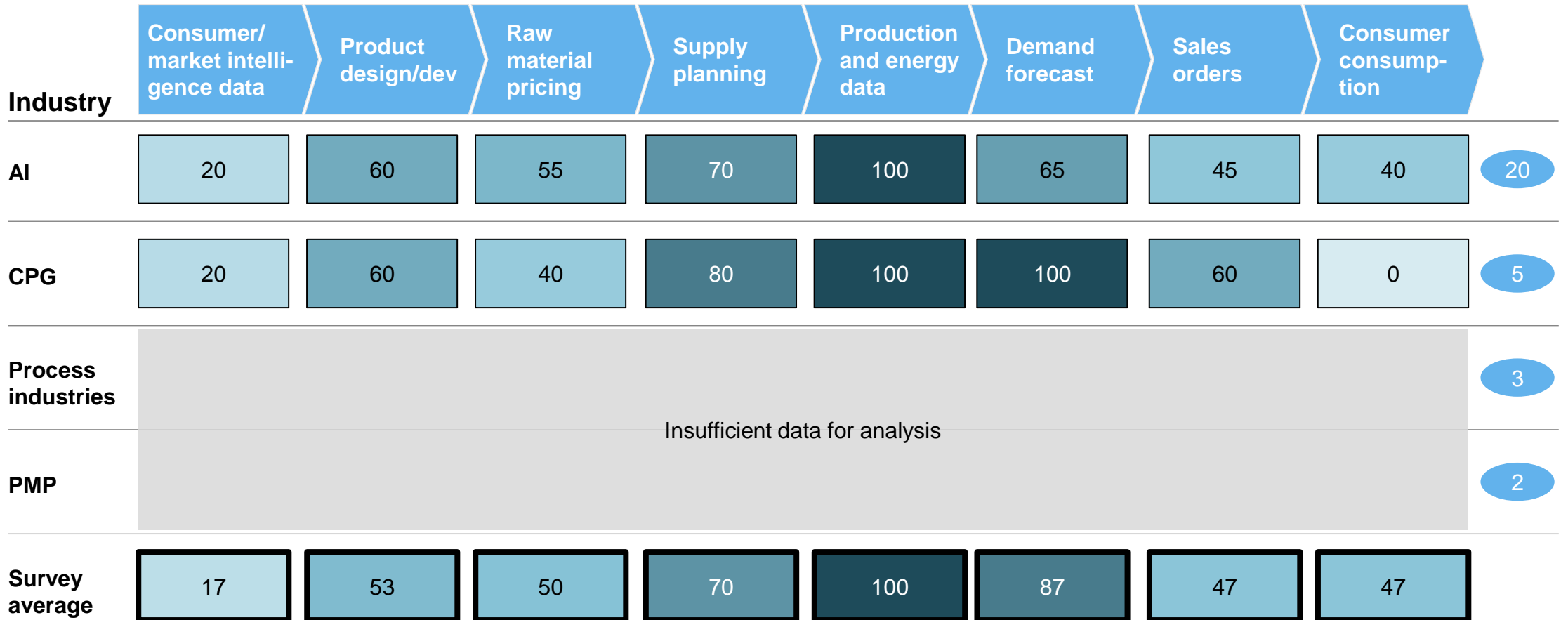
1. n=150, number of Lighthouse company responses

Original question: What were the top three factors that influenced your decisions on data strategy including management, storage, and infrastructure? Please click and drag to rank-order these options

Lighthouses are prioritizing data integration at the site level, with 100% reporting production and energy data is connected

Connected / integrated value chain data, % total responses by industry and type¹

Number of survey responses

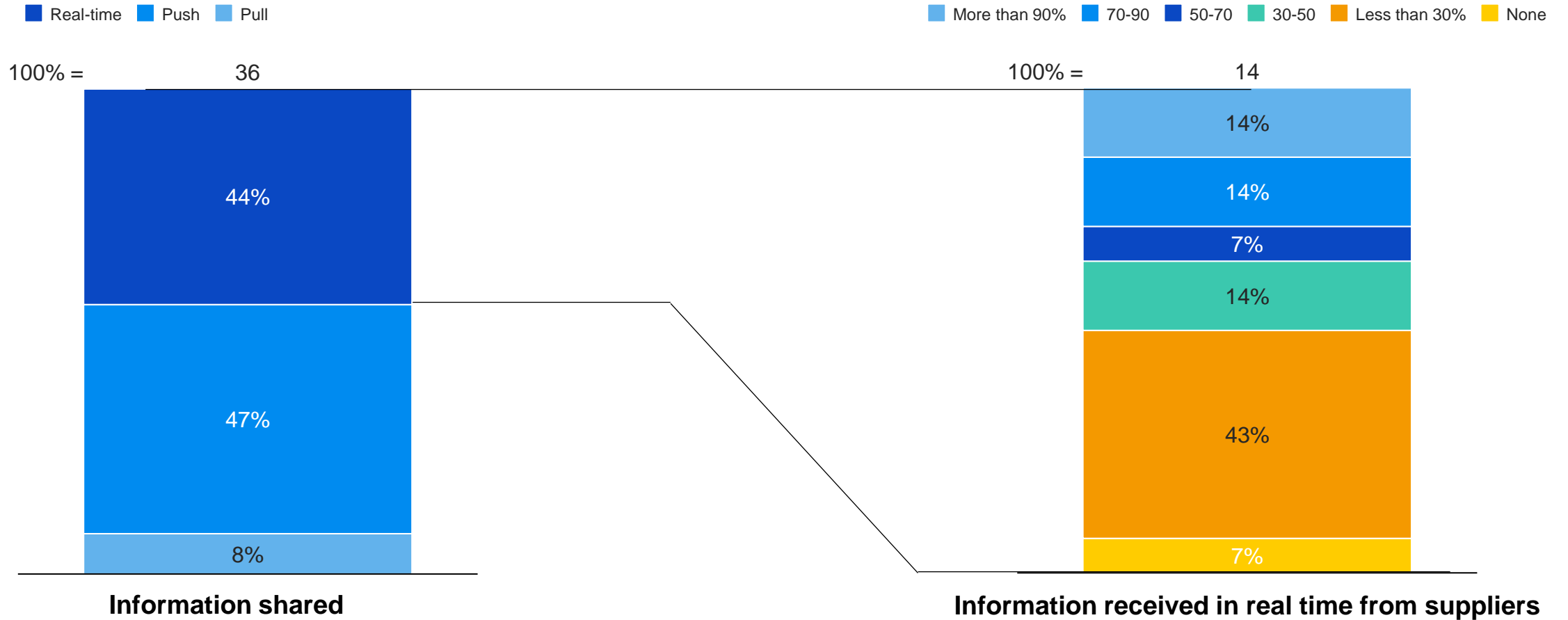


1. n=30, number of Lighthouse company responses

Original question: Connected data: what data from across the value chain are integrated into the local data platforms of your Lighthouse factories? Please check all that apply

While many Lighthouses share real-time data with suppliers, only 35% receive half or more data in real-time

Supplier information types and real-time visibility breakdown, % of respondents¹



1. n=36, number of Lighthouse company responses

Original question(s): (1) With what frequency and approach do you share information with suppliers (via supplier portal or other platform)?
 (2) Across what percent of your supply base is supplier production, quality, and shipping data integrated in near real-time into your company's data systems and platforms?