

MRO AMERICAS 2018

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Partner



Oliver Wyman's Aviation, Aerospace & Defense practice is the largest and most capable consulting team dedicated to the industry

OUR EXPERIENCE

- 250 plus professionals across Europe and North America
- Deep aviation knowledge and capabilities allow the practice to deliver data-driven solutions and provide strategic, operational, and organizational advice
- Increased technical aviation expertise in Europe from 2017 acquisition of UK-based AVISA Aviation Safety Systems

OUR CLIENTS

We have worked with many of the industry's Fortune 500 companies, including

- All major North American airlines
- Leading MROs, OEMs, and independent parts manufacturers in the Americas, Europe, and Asia
- Aerospace and defense firms

OUR APPROACH

Data-driven: unbiased benchmarking and forecasting tools to establish problems and identify solutions

Innovative: ideas that are forward-thinking

Actionable: results-oriented recommendations

Collaborative: an emphasis on working with our clients, alongside executives, management, and support teams

This presentation incorporates Oliver Wyman's 2018–2028 Global Fleet & MRO Market Forecast and 2018 MRO Survey, both of which are available at www.OliverWyman.com/MROSurvey2018

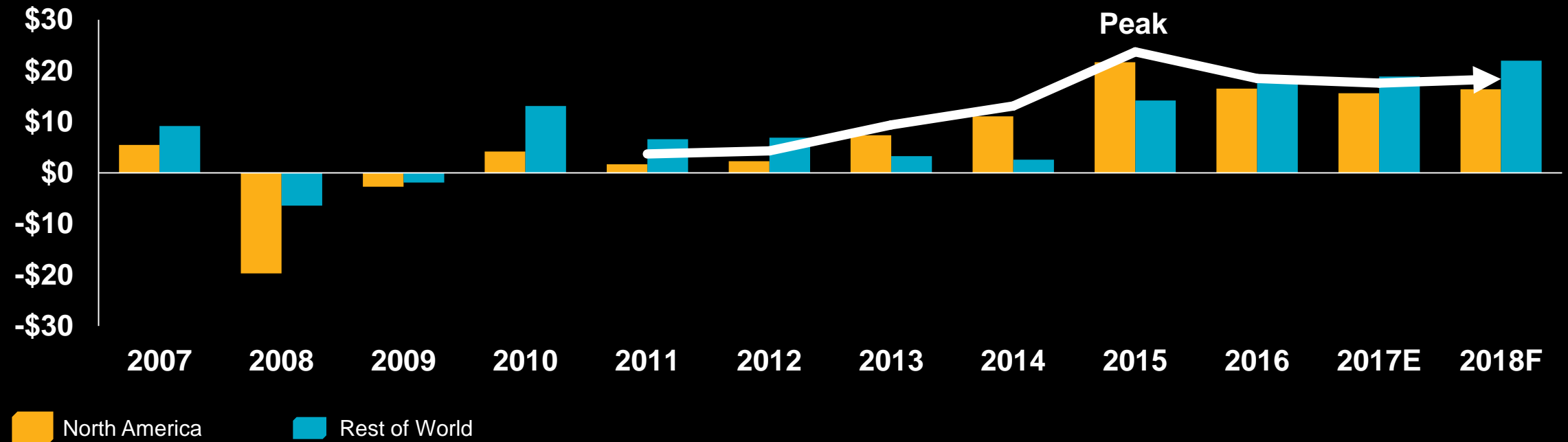


1 | Industry Overview

Global performance remains strong with North American operators continuing to deliver positive financial performance

Global Commercial Air Transport Industry Net Profit

By year / US\$ BN



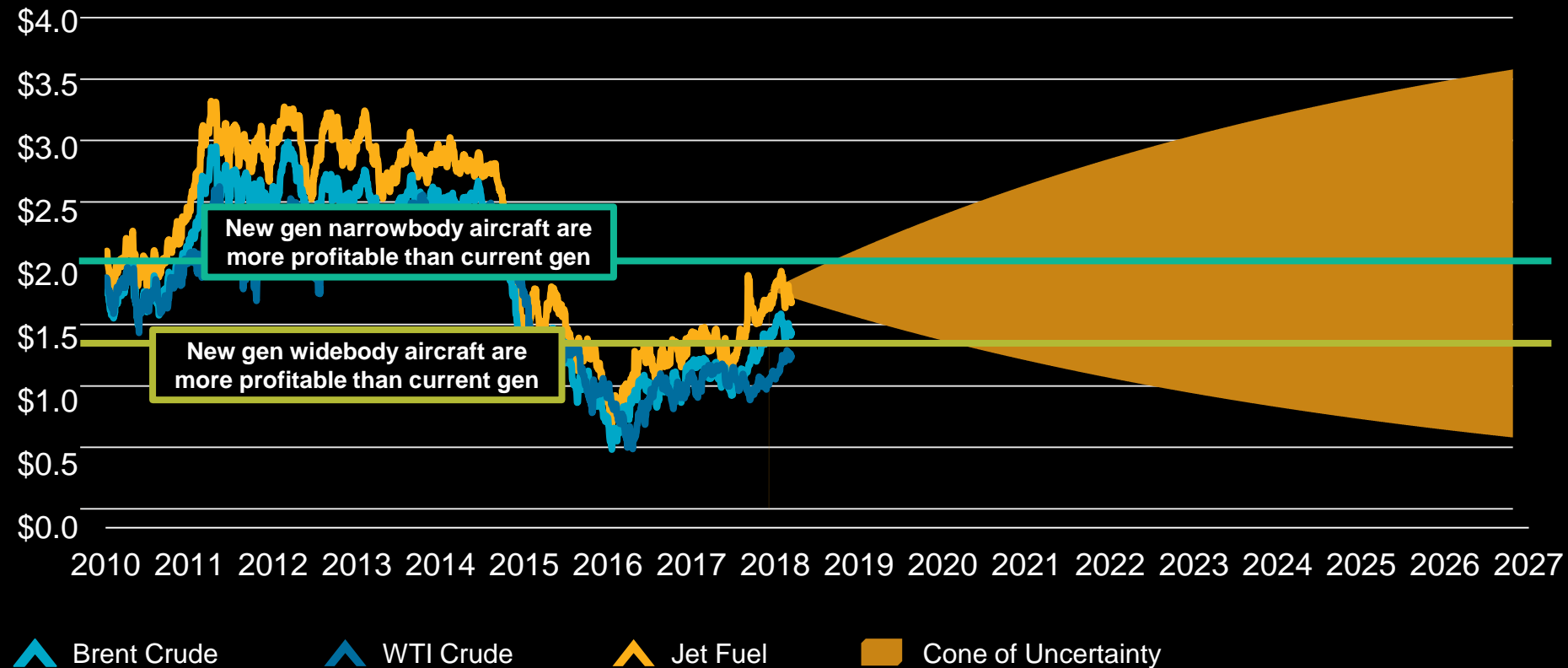
Continued growth in revenue from ancillaries, widespread capacity discipline, and a lack of new entrants are helping the North American operators offset the impact of shifting economics

Source: Source: IATA

As oil prices rebound, operators will face new cost pressures, particularly with the older generation widebody aircraft

Crude Oil and Jet Fuel Spot Prices per Gallon

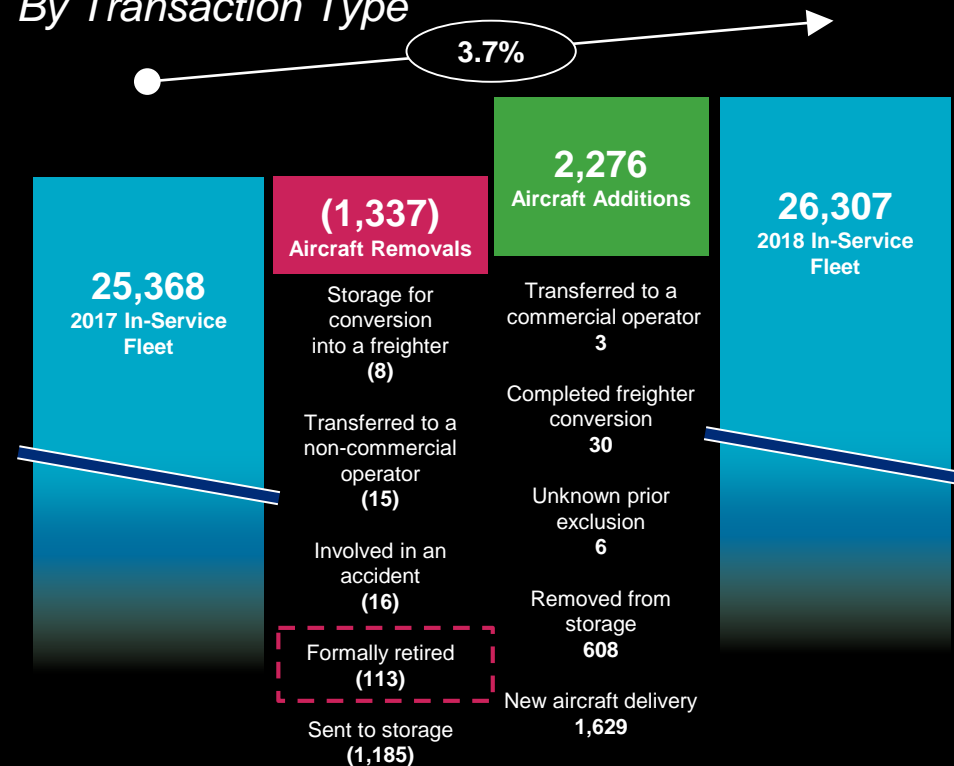
By year / US\$ BN



Source: U.S. Energy Information Administration, Oliver Wyman Analysis

Over the past year, status changes to 3,613 aircraft have lead the global in-service fleet to experience growth of 939 aircraft

Year Over Year Changes to the Global Commercial Air Transport In-Service Fleet By Transaction Type



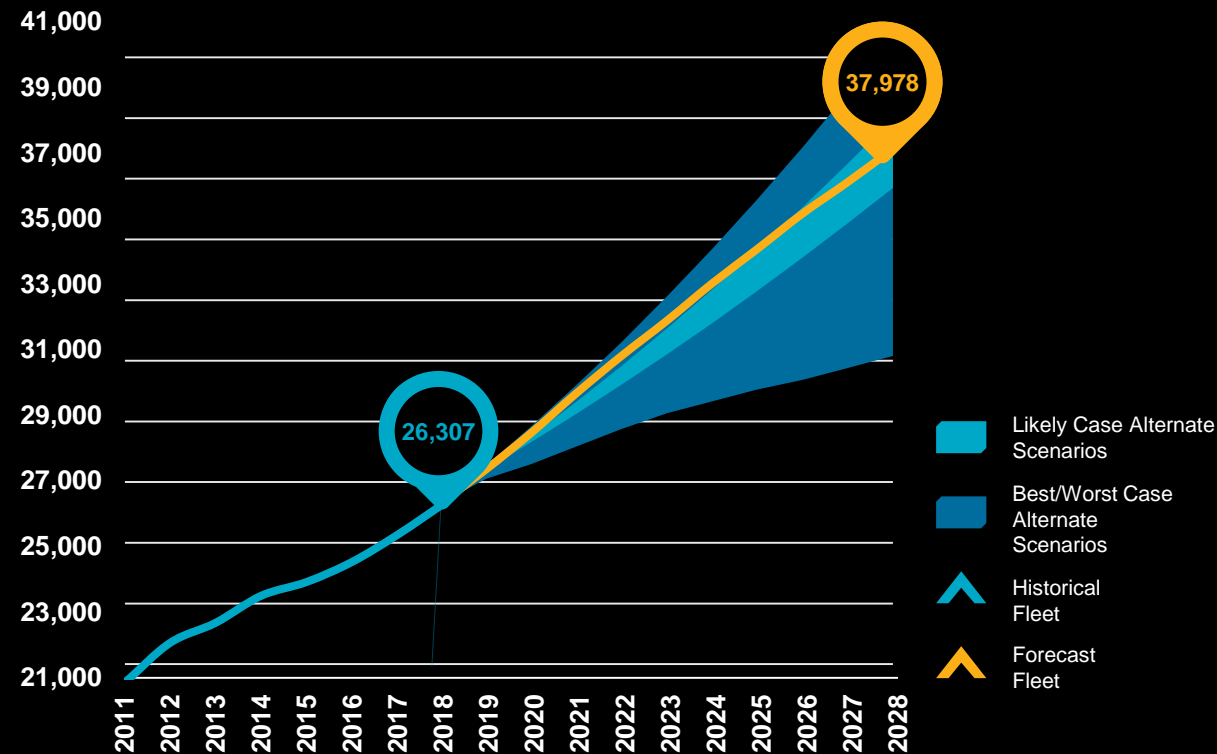
2018 Global Commercial Air Transport MRO Market Forecast By MRO Segment



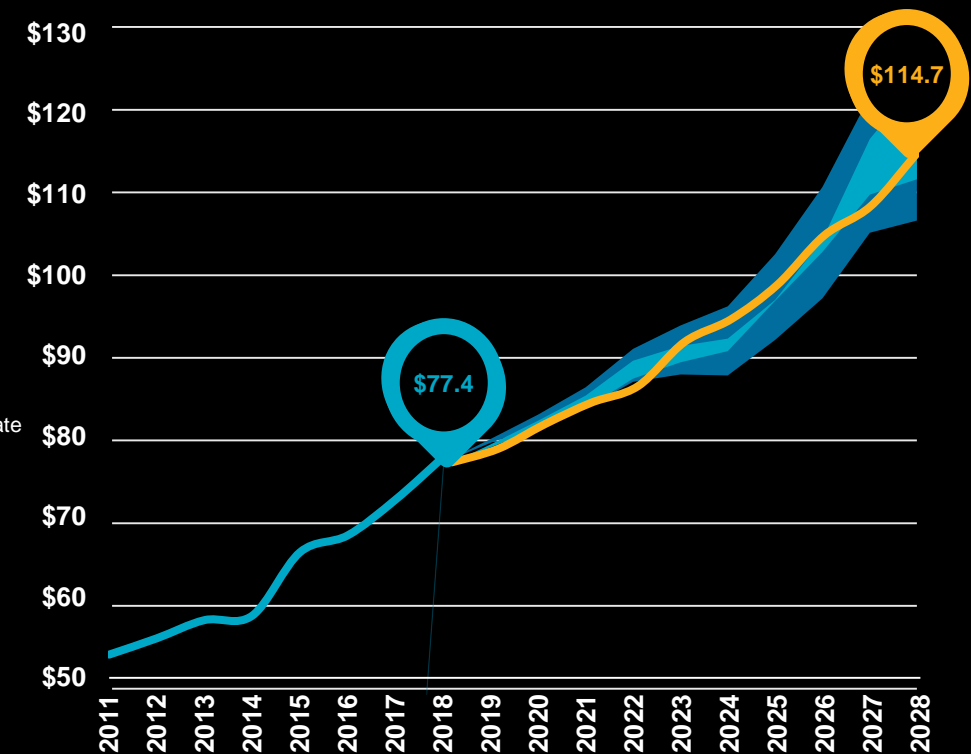
Translating the changing fleet dynamics into MRO, the 2018 market is forecast to be \$77.4B, with engine MRO continuing to be the driver of growth

Though the global fleet & MRO market are expected to increase nearly 50% by 2028, increasing costs (e.g., oil prices) & external market factors (e.g., interest rates) create considerable uncertainty for realized growth

Global Commercial Air Transport Fleet Forecast
By year / number of aircraft



Global Commercial Air Transport MRO Market Forecast
By year / US\$ BN

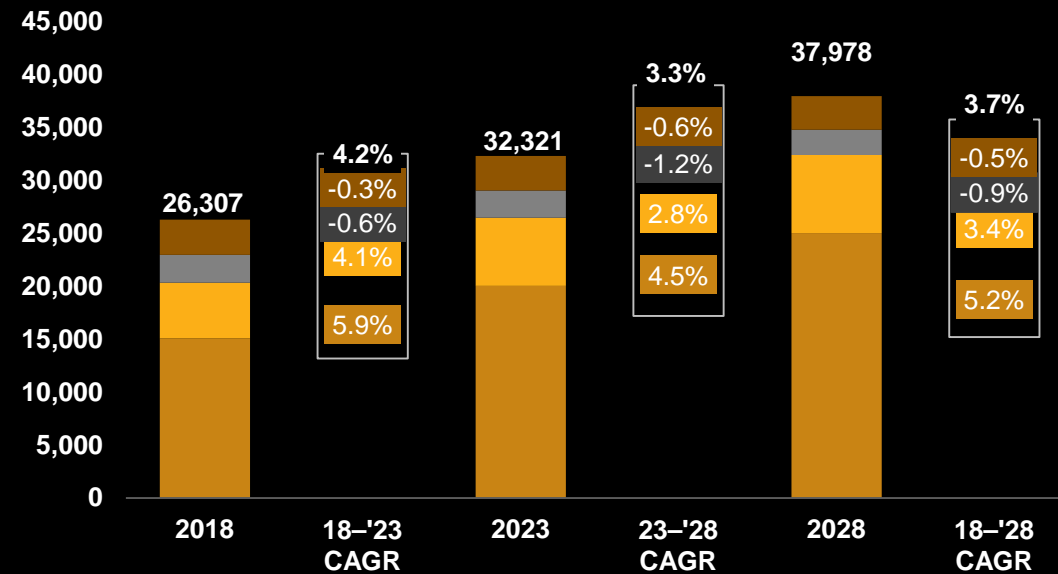


A extended trade war between the US and large trading partners such as China and Europe would likely drive the forecasts to the lower bounds and shave several years of growth off the industry's potential

The global fleet is forecast at an annual growth rate of 3.7%, while the MRO market is forecast to grow at an annual rate of 4.5%

Global Commercial Air Transport Fleet Forecast

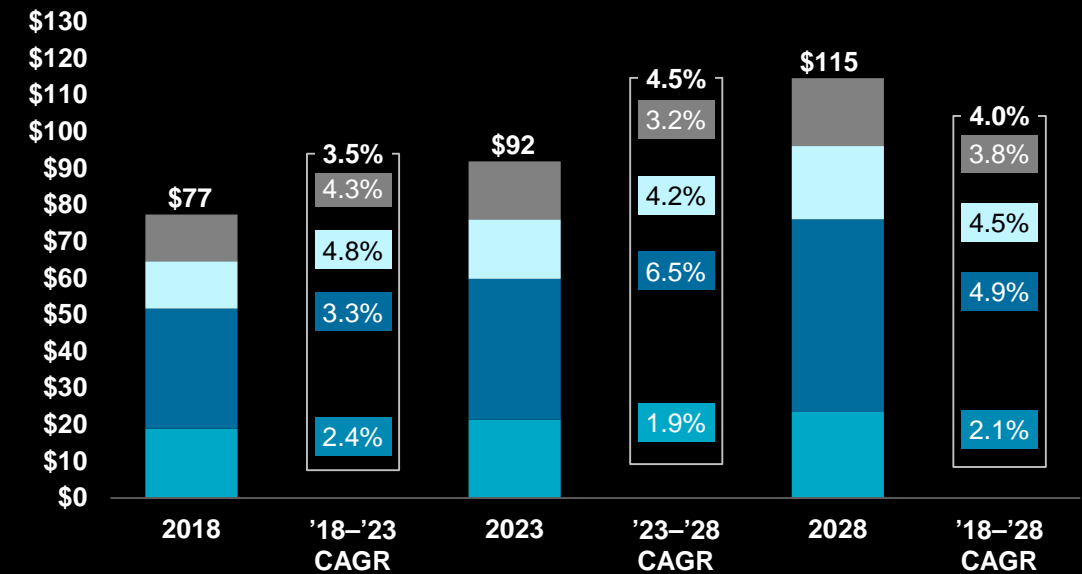
By Aircraft Class / number of Aircraft



■ Narrow-body
 ■ Wide-body
 ■ Regional Jet
 ■ Turbo-prop

Global Commercial Air Transport MRO Forecast

By MRO Segment / US\$ BN



■ Airframe & Mods
 ■ Engine
 ■ Component
 ■ Line

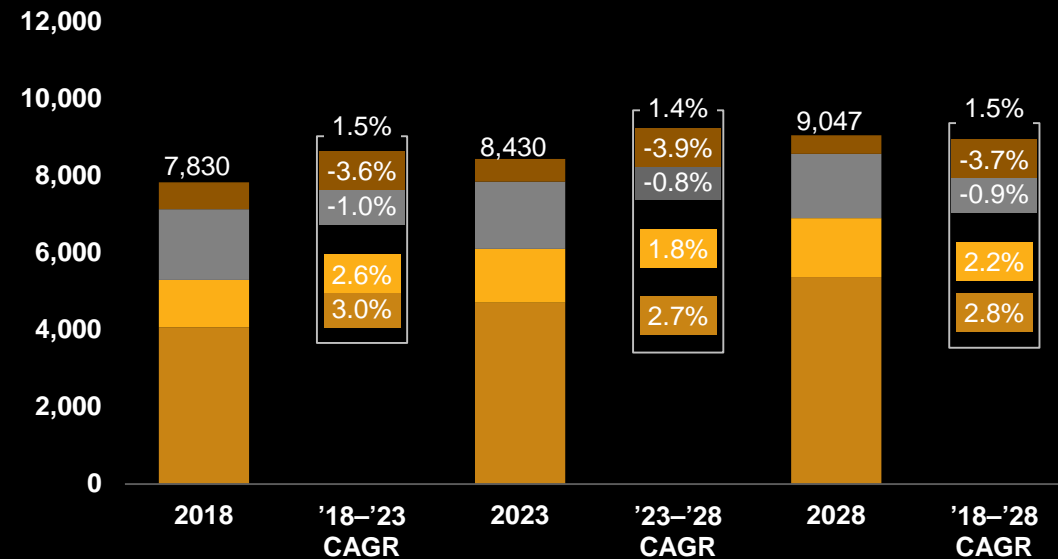
Next gen narrow body aircraft will dominate the global fleet growth, while expensive engine shop visits associated with more fuel efficient technologies will drive the growth in the MRO market

Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

North America is forecast to experience very moderate growth of 1.5%, reaching a fleet size of just over 9,000 aircraft by 2028

North America Commercial Air Transport Fleet Forecast

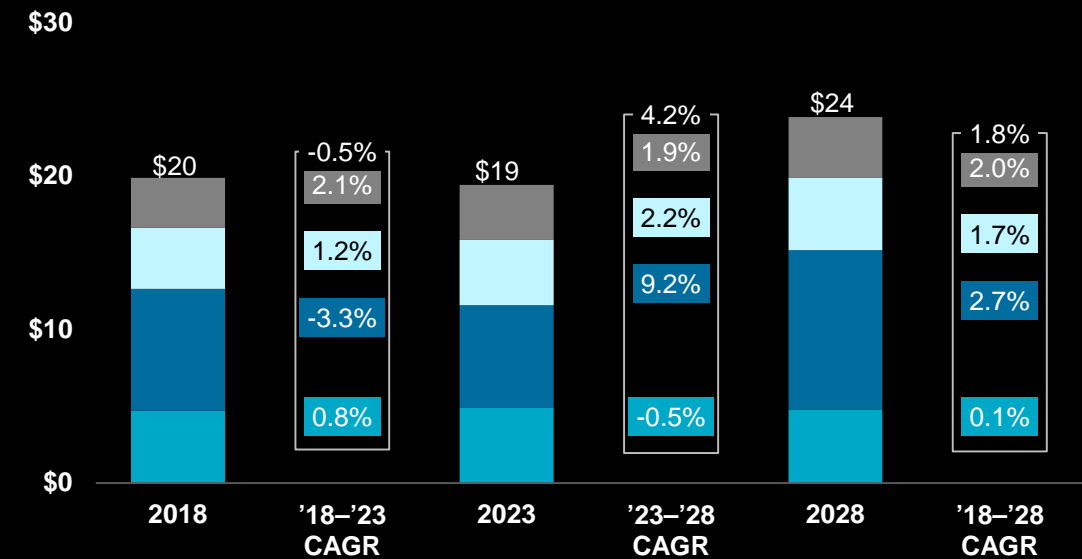
By Aircraft Class / number of Aircraft



■ Narrow-body
 ■ Wide-body
 ■ Regional Jet
 ■ Turbo-prop

North America Commercial Air Transport MRO Forecast

By MRO Segment / US\$ BN



■ Airframe and Mods
 ■ Engine
 ■ Component
 ■ Line

While North America MRO spend is expected to decline over next 5 years, it is expected to grow faster in the following 5 years, leading to an overall 1.8% annual growth rate between 2018–2028

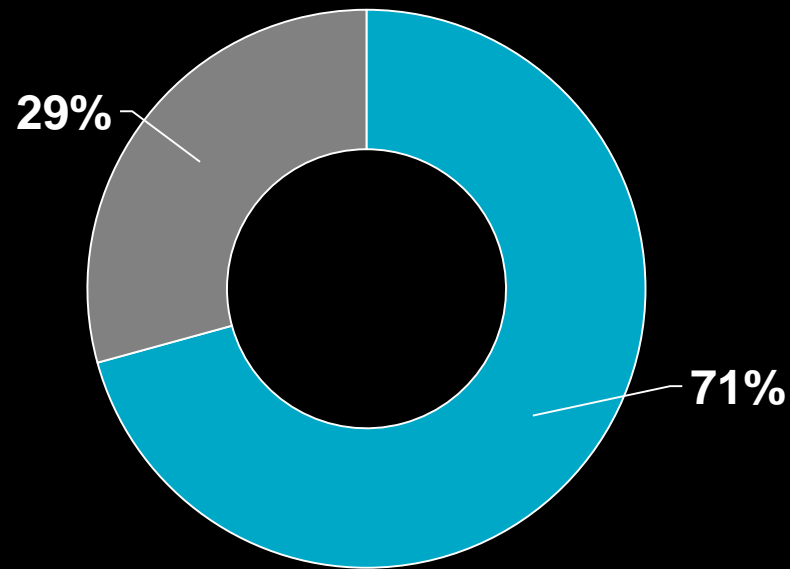
Source: Oliver Wyman Global Commercial Air Transport Fleet Forecast

2a | The industry's OEM
preoccupation

As has been the case for the past few years, survey respondents are concerned about increasing OEM presence in the aftermarket

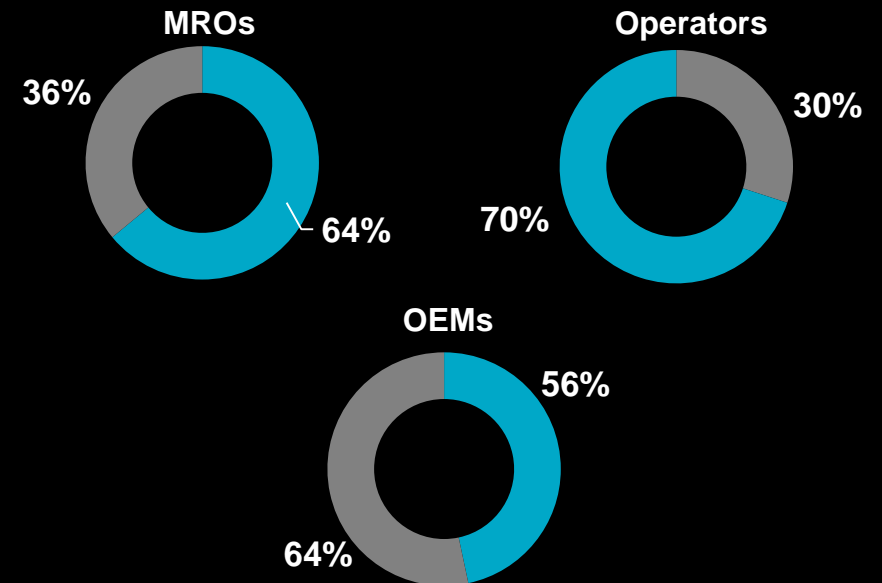
Will OEMs' increasing presence in the aftermarket fundamentally change your market?

Distribution of total responses



Segment deep dive

Distribution of responses for selected segments



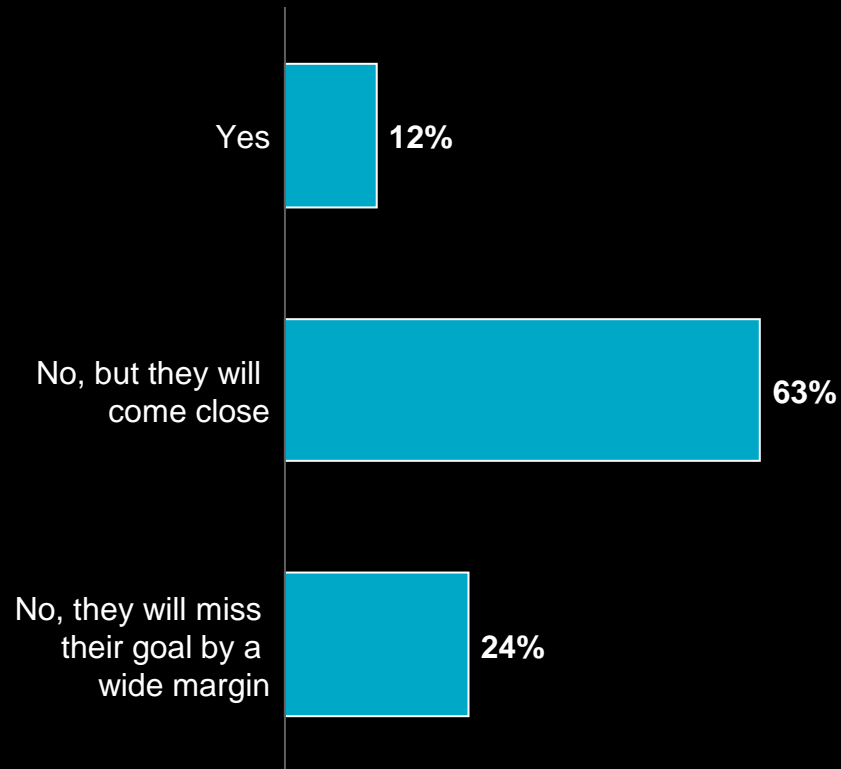
■ Yes ■ No

Interestingly, OEMs themselves are less convinced about their impact in fundamentally changing the aftermarket

This year's survey indicates that 75%+ of respondents see OEMs as credible in their ambitions

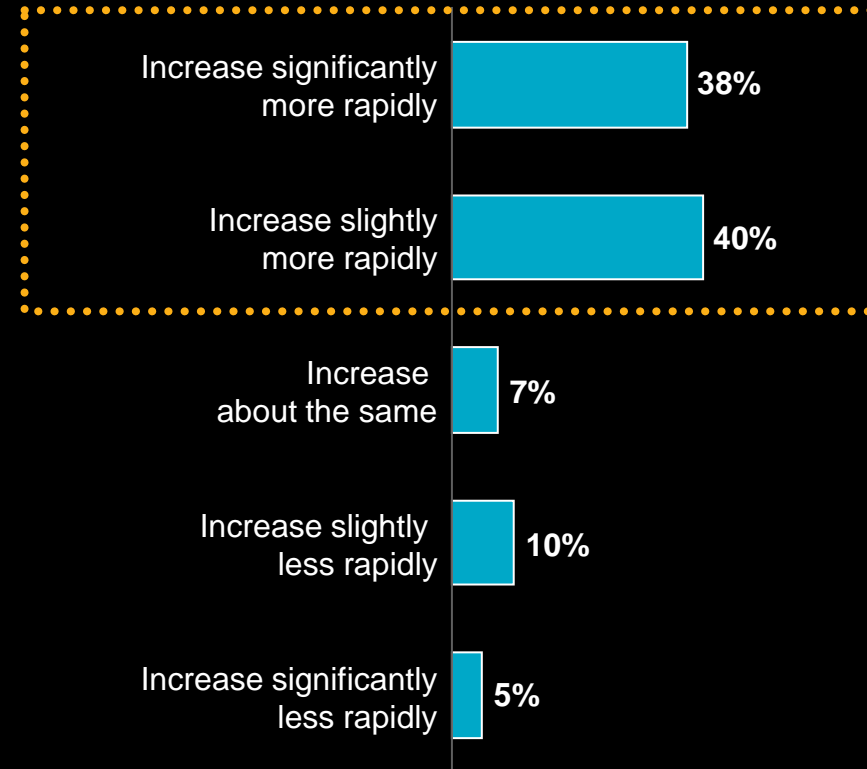
Do you think OEMs' growth targets for their aftermarket business units are achievable within the next decade?

Distribution of total responses



Compared to the market growth, OEMs' share of the aftermarket over the next 3 years will...

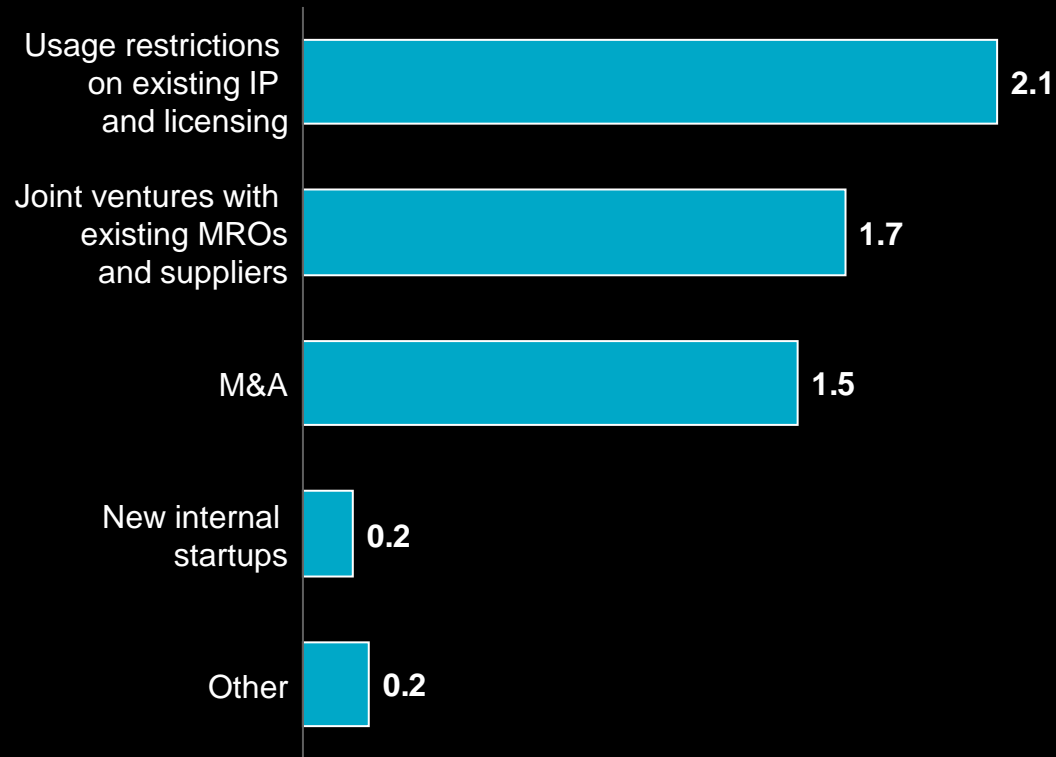
Distribution of total responses



OEMs are expected to leverage the strength of their IP positions to increase share of the aftermarket in the near term

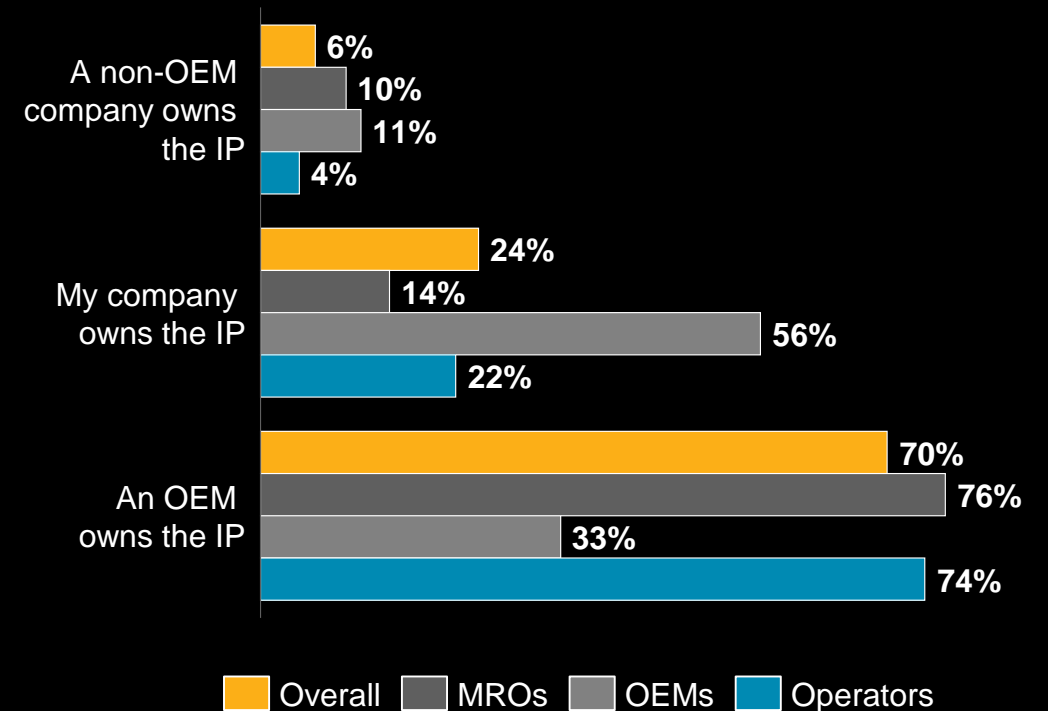
How will OEM grow their presence in the aftermarket?

Weighted average of rankings (highest to lowest ranking, scale of 3 - 1)



Who is the (majority) owner of the IP your current aftermarket service offering depends on?

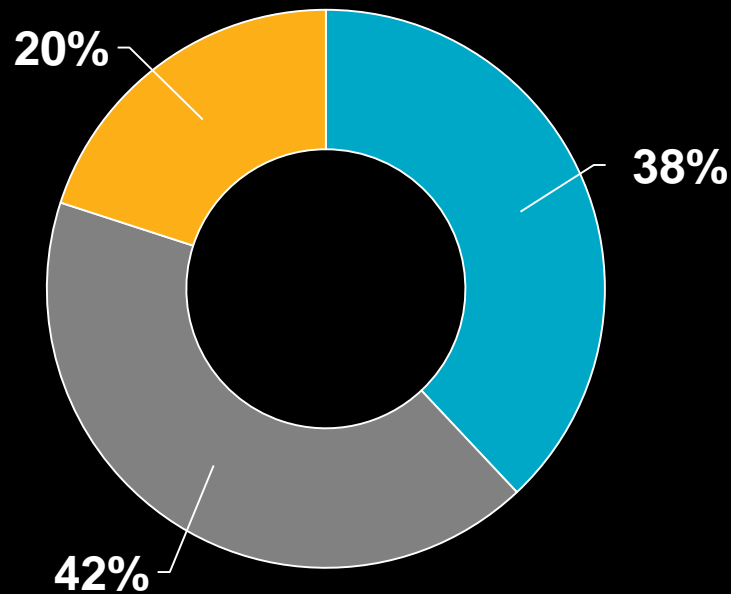
Distribution of total responses



And only the OEMs are comfortable with their IP ownership position; third party MROs clearly feel the most vulnerable

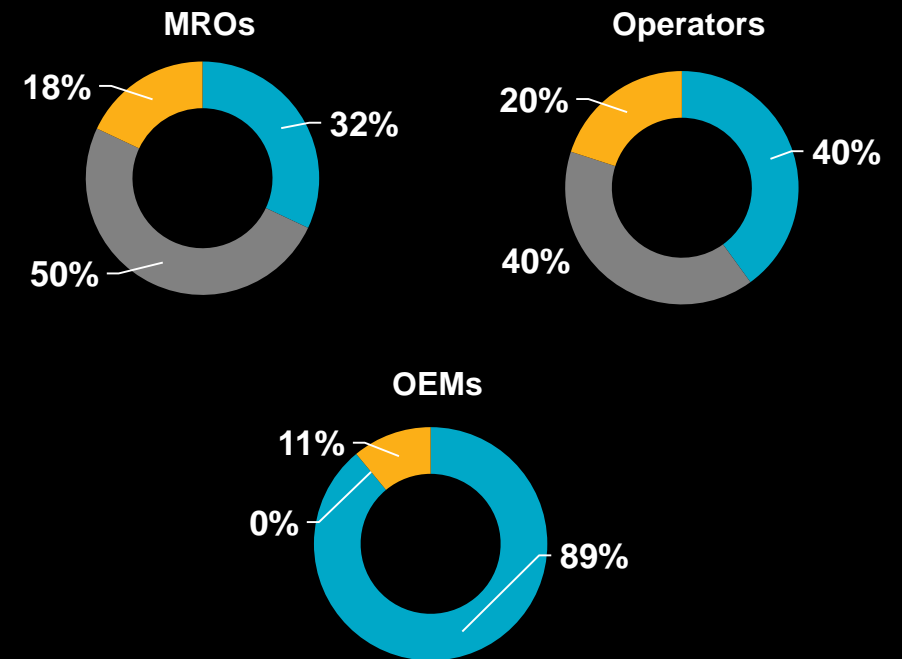
Do you own enough of the IP or OEM authorized licensing to continue to be successful if an OEM restricts use of the IP they own or licenses they provide?

Distribution of responses



Segment deep dive

Distribution of responses for each segment



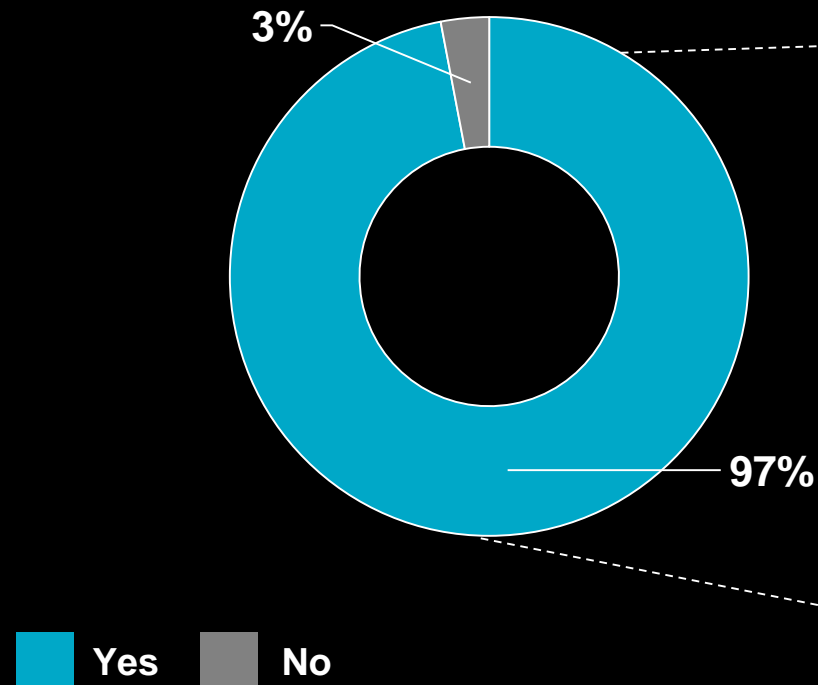
Yes No No opinion

2b | Dealing with rising costs

Almost all respondents report experiencing increasing material costs

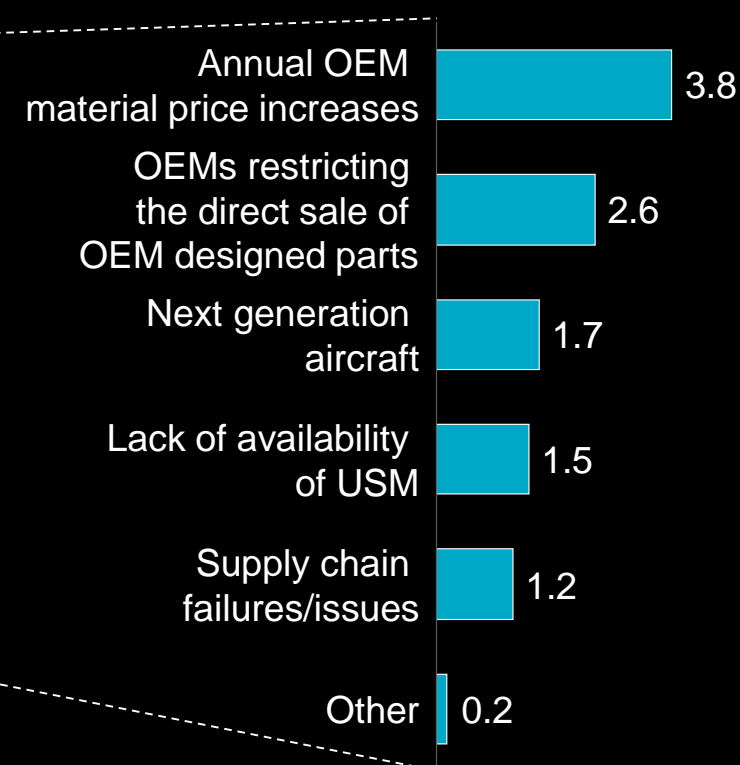
Have you experienced an increase in material costs?

Distribution of responses



Main drivers of material cost increases (for yes responses)

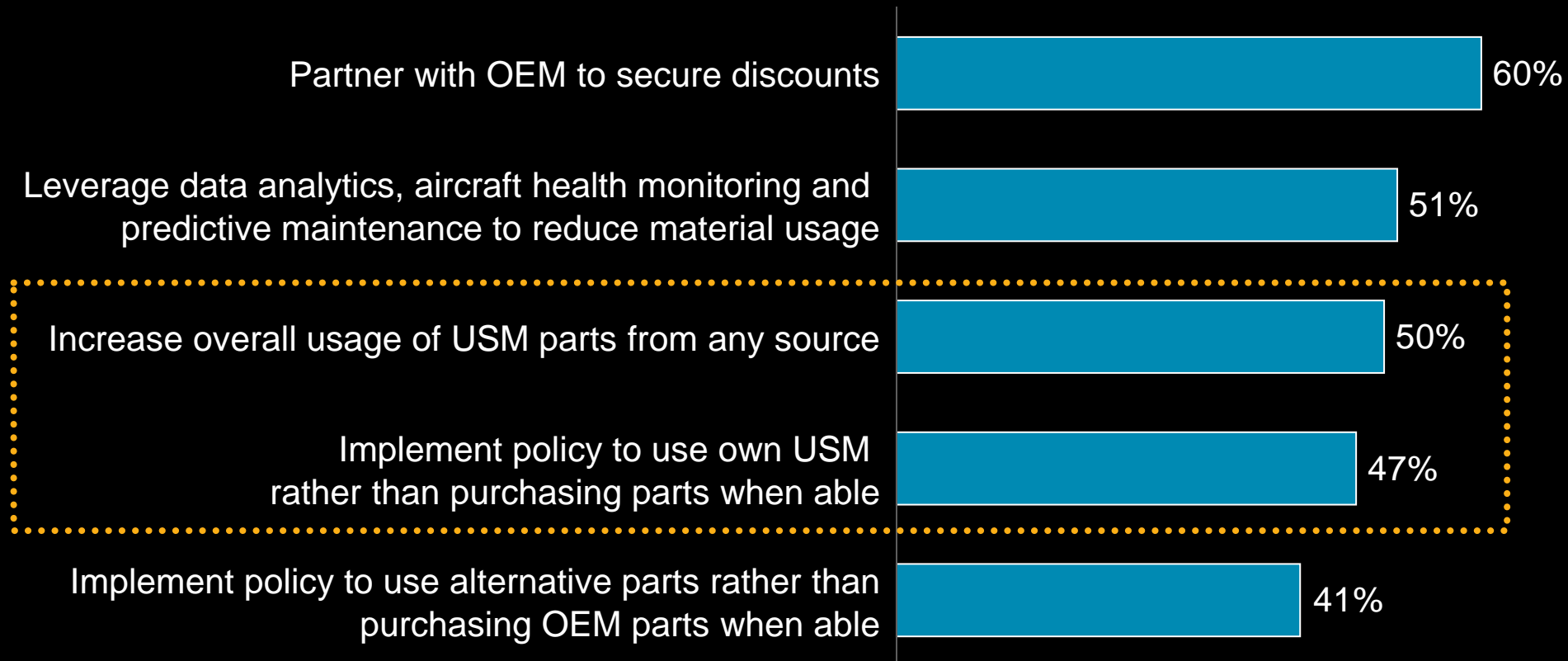
Weighted average of rankings (highest to lowest ranking, scale of 5 - 1)



However respondents have no single dominant strategy to combat rising material costs

What strategy or strategies have you adopted or are you considering to combat rising material costs?

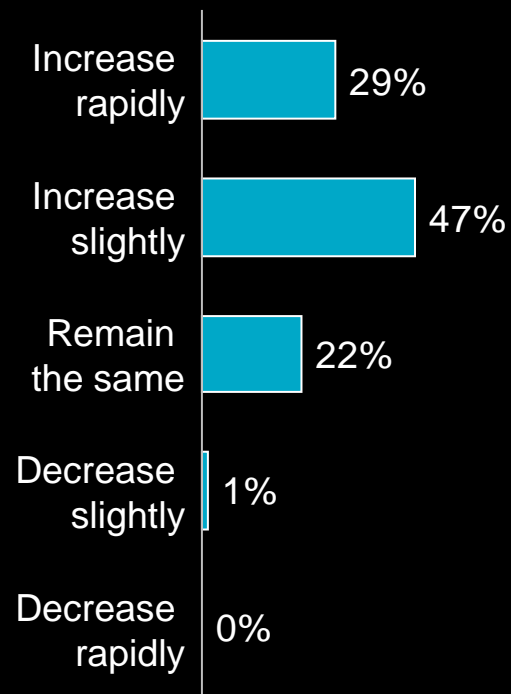
% of respondents who selected each response (for top 5 strategies only)



An increase in USM from a small base is expected; however, lack of supply and lack of a clear sourcing strategy are big inhibitors

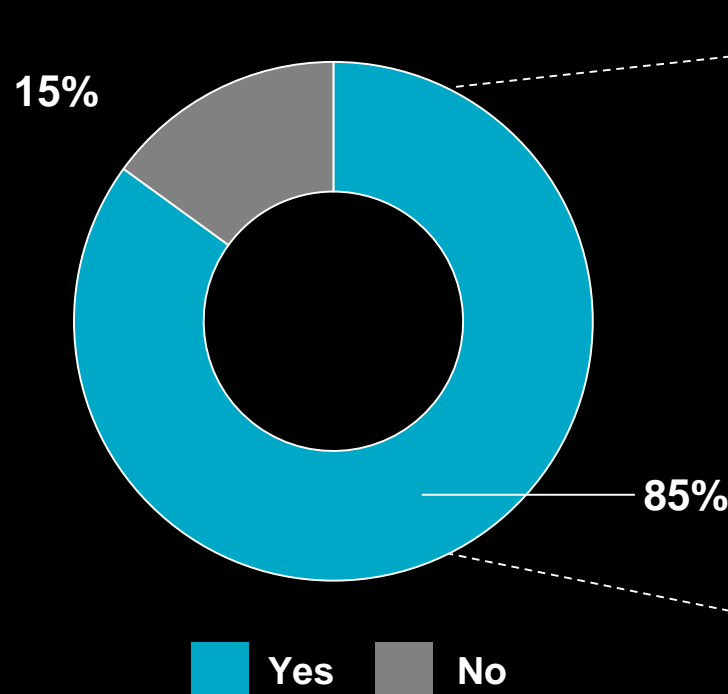
How will your USM change over the next 5 years?

Distribution of total responses



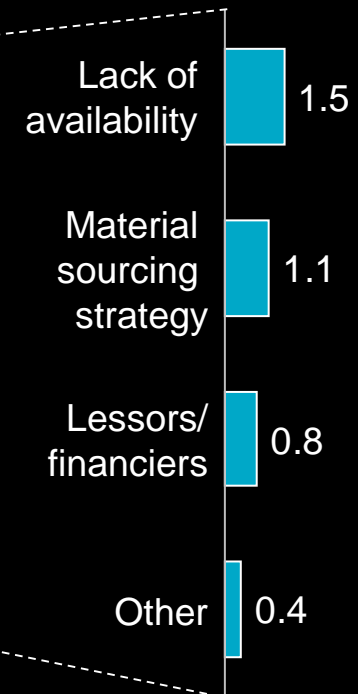
Is your use of USM inhibited?

Distribution of total responses

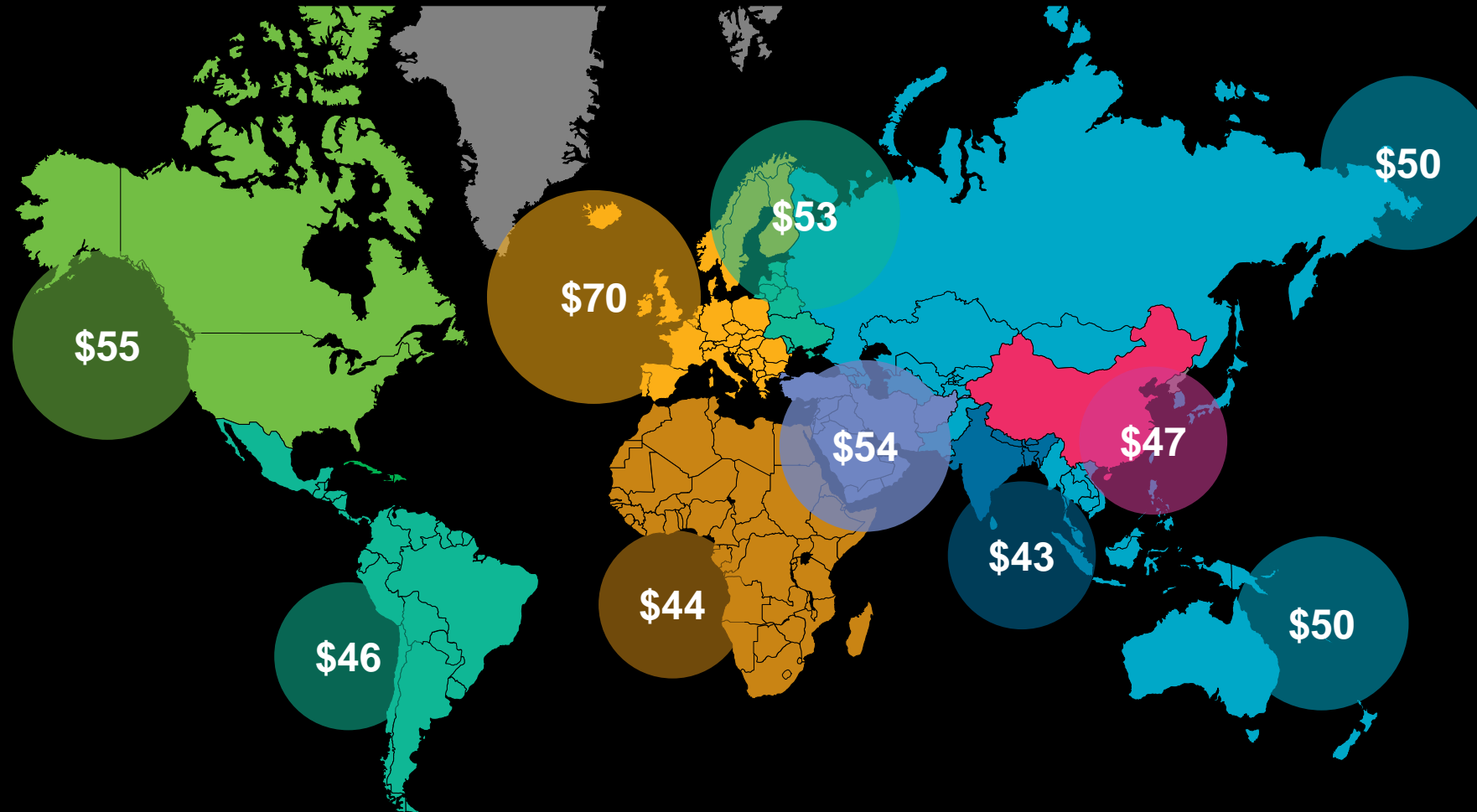


Main factors inhibiting use of USM

Weighted average of rankings (highest to lowest ranking, scale of 3 - 1) (amongst yes responses)



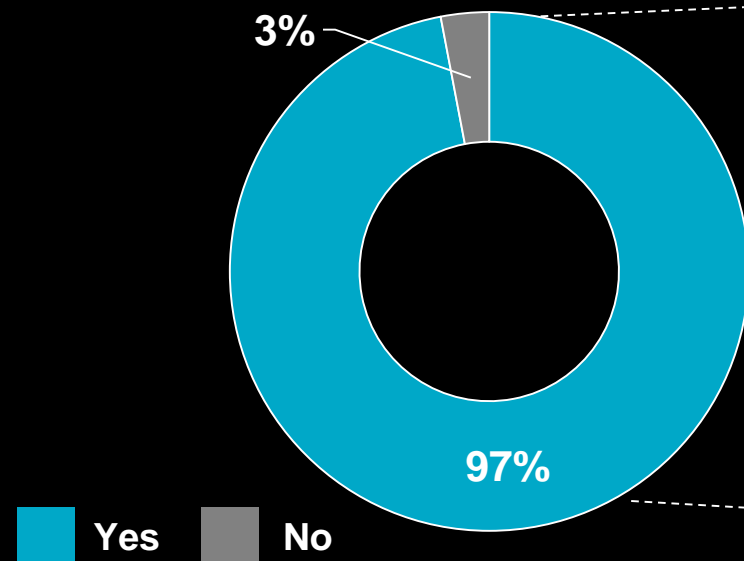
On the labor front, not surprisingly, W Europe is the highest technician bill rate region, E Europe and N America are on par, with all other regions substantially lower



And globally, respondents overwhelmingly indicate that a lack of labor supply is the primary driver of wage increases by a factor of two

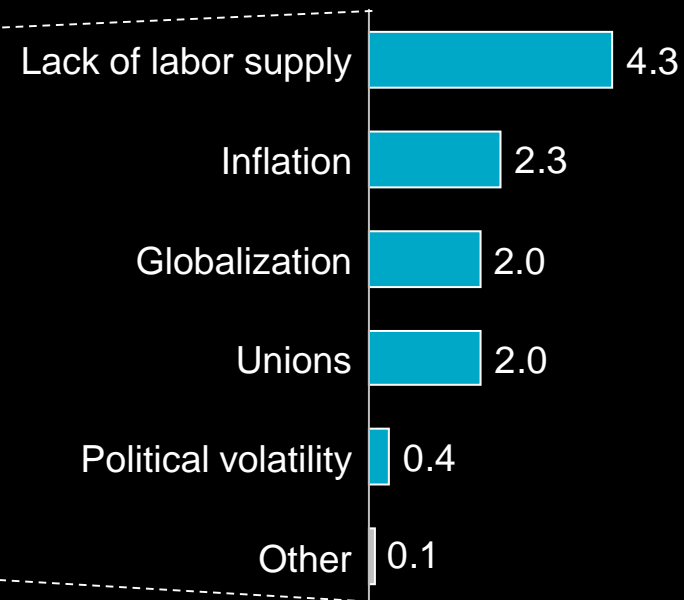
Have you experienced any upward *technician* wage pressure?

Distribution of total responses



Main drivers of technician wage pressure (for yes responses)

Weighted average of rankings (highest to lowest ranking, scale of 5 - 1)



Technician retirements and a lack of new technician creation continue to squeeze both ends of the workforce spectrum – a trend that is unlikely to be resolved soon

Combatting rising labor costs: many strategies are being considered by Operators, MROs and OEMs

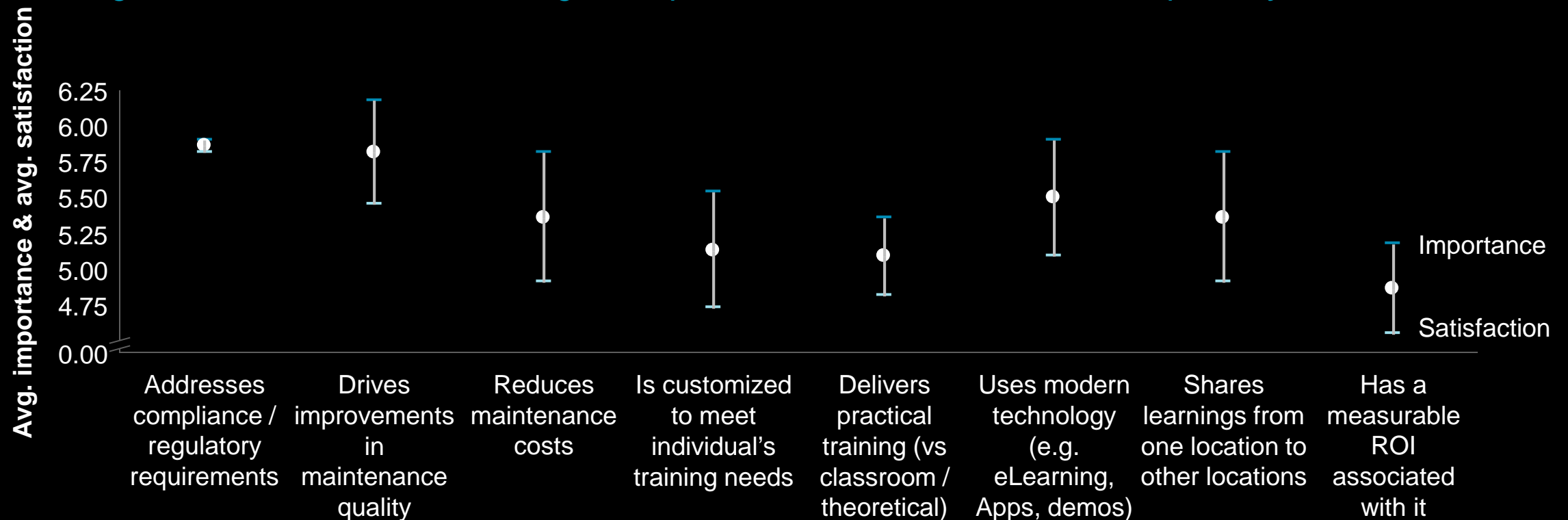
What strategy or strategies have you adopted or are you considering to combat rising labor costs?
% of respondents who selected each response



Training programs are seen as a key to improving labor productivity, but a large gap between importance and satisfaction exists

Difference between average importance ranking vs. average satisfaction ranking

Rankings on a scale of 0 to 10; rankings of importance and satisfaction made separately



2c | Cybersecurity

Every day and across every facet of life, hackers are increasingly bolstering capabilities to launch cyberattacks and disrupt industries

Nature of cyber threats has evolved drastically over just the past decade

Experts place the number of expert, **professional hackers** at **over 300,000 globally**



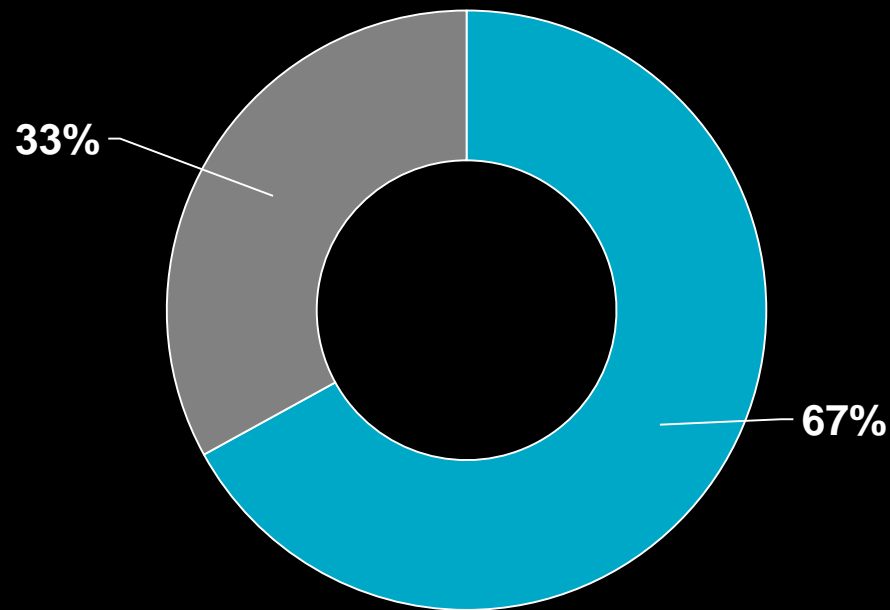
Hackers use a variety of means to achieve a number of ends

Global counter-hacking efforts and actual damages are estimated at **half a trillion US\$ annually**

67% of respondents indicate they believe that they are prepared, yet less than half had conducted a review of cybersecurity risk in 2017

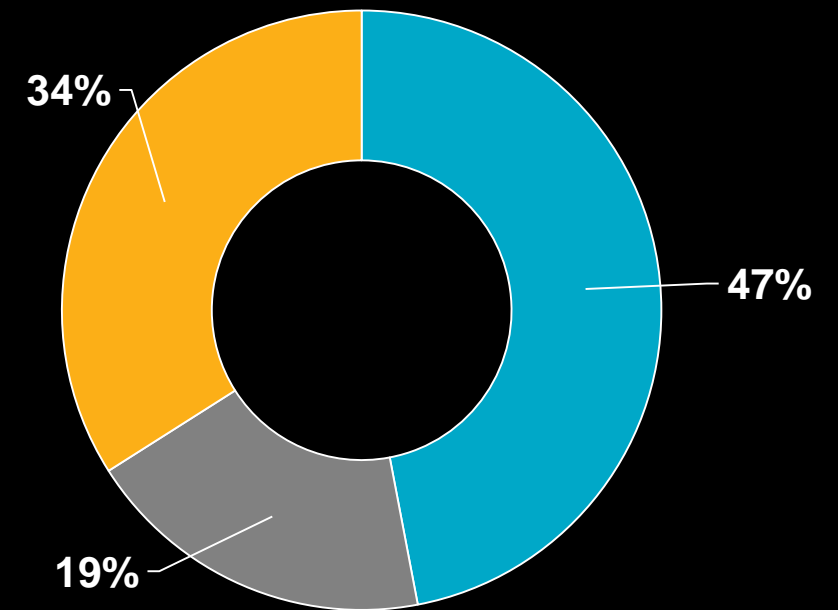
Is your company well prepared to handle cybersecurity threats related to operations and maintenance?

Distribution of total responses



Has your company conducted a review of your cybersecurity risk in operations and maintenance in 2017?

Distribution of total responses



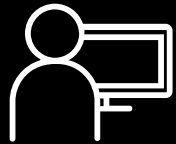
■ Yes ■ No ■ Unknown

A chain is only as strong as its weakest link; stolen credentials have lead to multiple, significant breaches



Target (2013)

- Hackers used stolen credentials of a Target vendor to penetrate Target's network
- Planted Russian-coded malware and stole **personal data of 70 MM customers and information on 40 MM payment cards**
- Cost to Target: **~\$300 MM**



Third-party vendor (2014)

- Hackers stole log-on credentials – used to steal data from 56 MM credit and debit cards and 53 MM customer emails
- Cost to vendor: \$180 MM+



Global Infrastructure attack (2017)

- Hackers attacked the Ukraine with wiper malware (*NotPetya*)
 - Wiped out data and disrupted operations across industries (banking, transportation, energy)
- Spread to computer systems around the world after computers at the Danish shipping conglomerate Maersk were infected (**cost to Maersk: \$300 MM**)
- Led to serious delays in major ports (e.g. Rotterdam, Port of New York and New Jersey); temporary shutdown largest terminal at the port of Los Angeles

**The MRO industry
has not yet had a
major Target or
Equifax level cyber-
attack – are we next?**



Oliver Wyman believes three factors make the MRO industry a prime candidate for a major cyber attack



Industry players have access to the networks of world's airlines and OEMs

- Any business in this supply chain becomes target



MRO providers operate across the globe

- MRO companies more vulnerable to regional disparities in security
- Attractive for hackers looking to cause maximum, cross-border disruption



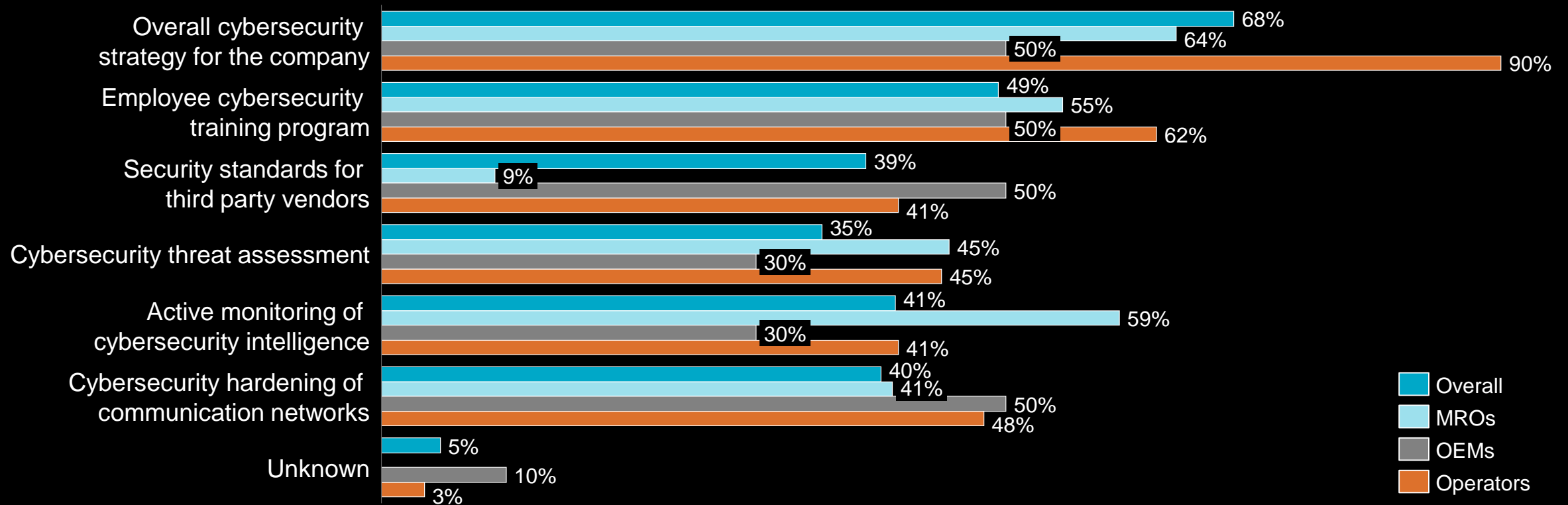
Industry is becoming increasingly digitized

- More interconnectivity, more access points (e.g. Internet of Things), more direct third-party participation
- Difficult to control for all the hands that can come in contact with multitude of processes, systems & data

While the majority of companies show an appropriately elevated level of concern, the survey reveals considerable variability in levels of preparedness

Which cybersecurity safeguards has your company implemented?

% of total respondents who selected each response for each segment



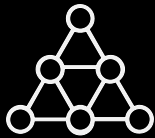
To achieve a comprehensive, unified cybersecurity and risk management approach for the industry, companies should consider a comprehensive approach

1



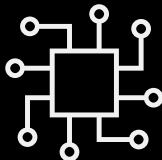
Evaluate current state cyber security programs to identify areas of improvement

2



Develop a clear framework for mitigating and managing cyber risks

3



Fortify information technology systems and create a security-minded culture across companies

While no solution is guaranteed to avert all attacks, developing a shared, holistic approach to cybersecurity risk management may give companies a huge advantage

3 | Summary

Summary

- The 2018 global MRO market is at \$77.4 BN and is anticipated to reach \$115 BN by 2028

- At the same time, MROs continue to battle higher material and labor costs and there are no clear, easy answers

- OEMs are expected to continue their push into MRO services and will hit or come close to meeting their growth ambitions

- Finally, cyber threats are mounting , causing increasing disruption across industries and will impact ours soon; we need to be prepared



This presentation and related reports are available at www.OliverWyman.com/MROSurvey2018

