



Value of Reliability: ABB Survey Report 2023

Industry's perspective
on maintenance and reliability

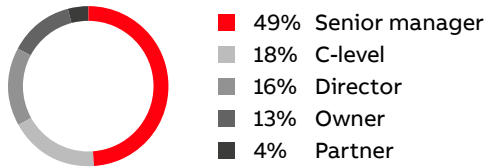


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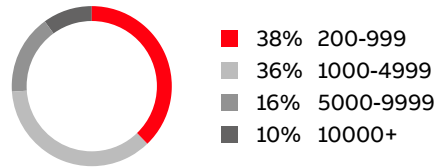
Survey methodology

3,215 total respondents

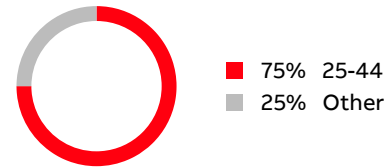
Role type



Company size no. of employees



Age



Countries



Company sectors

29% Energy/power	12% Oil and gas	12% Food and beverage	11% Metals
10% Utilities	8% Chemical	7% Plastics/rubber	4% Rail
2% Marine	2% Water/wastewater	1% Wind	

ABB survey commissioned by Sapio Research in July 2023

Executive summary

Foreword



By Virve Viitanen,
Head of Global Customer
Care and Support,
ABB Motion Services.

The high cost of downtime increasingly constrains industrial businesses in an already uncertain landscape. This encompasses both direct costs – like wasted production or spare parts – and indirect costs – like reputation and morale.

Our survey of 3,215 plant maintenance leaders across the globe found that outages cost the typical industrial business a hefty \$125,000 USD per hour*. A significant 69 percent of plants experience unplanned outages at least once a month. Yet, 21 percent of respondents still conduct run-to-fail or “reactive” maintenance.

Regular maintenance is important to all industrial businesses, but certain strategies are more effective than others at achieving uptime. Nine in ten respondents said that maintenance has increased their uptime in the last year, but businesses using a condition-based strategy reported the best performance.

While almost half of respondents identified reliability as a top priority when purchasing equipment, only 20 percent said the same of uptime. This underscores a critical point – operators are still not making the connection between the benefits of reliable equipment on uptime, their business reputation, and their bottom line.



Executive summary

Foreword

The American Society for Quality defines reliability as “the probability that a product, system, or service will perform its intended function adequately for a specified period of time or will operate in a defined environment without failure.” In other words, it’s a measure of the dependability and consistency of performance.

Reliability and uptime are closely linked – a reliable piece of equipment will function at peak performance for longer. This places a growing emphasis on reliability-centered services such as condition monitoring and other planned or advisory services. These aim to predict and prevent sudden breakdowns that represent costs – in terms of wasted materials, labor, spares and valuable production time.

In my view, the objective for industrial businesses should be to transition from a high-risk run-to-fail maintenance approach to a long-term outcome-based maintenance strategy. This will improve reliability and cut costs overall. I’m encouraged that 87 percent of respondents would be interested in an outcome-based maintenance agreement. In addition, three in five (60 percent) respondents plan to increase their investment in reliability and maintenance over the next three years.

Companies anticipate several benefits from this, such as improved energy efficiency (55 percent), extended device lifecycles (51 percent), faster response to customer demands (51 percent), and a reduction in unplanned downtime (50 percent). Shifting to

outcome-based thinking (also known as “servitization”) has been shown to produce substantial cost savings as a general business model.

Investing in reliability is the pathway to maximizing uptime, saving costs, increasing competitiveness and protecting piece of mind. Outcome-based service models will be a key component of maintenance in the future. In an increasingly uncertain world, it makes sense to control things that are within your control.

Virve Viitanen

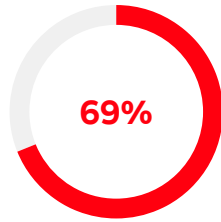
*The survey is based on information provided by third parties in response to a questionnaire, rather than reviewing actual accounting records.

Executive summary

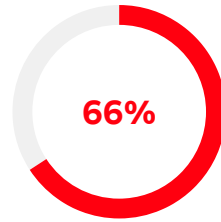
Key survey findings



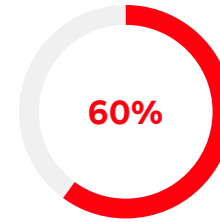
Outages cost typical industrial businesses \$125,000 per hour



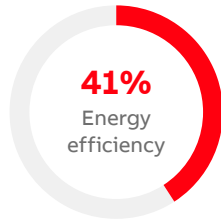
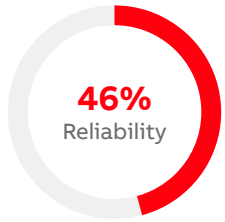
69% of plants or sites experience unplanned outages at least once a month



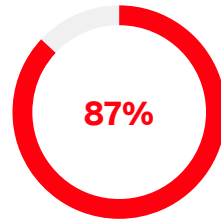
66% of respondents still use run-to-fail or time-based (preventive) maintenance strategies



60% are planning to increase their investment in reliability and maintenance in the next three years



Reliability (46%), safety (43%), and energy efficiency (41%) are the top priorities when purchasing new equipment



87% would be interested in an outcome-based maintenance agreement

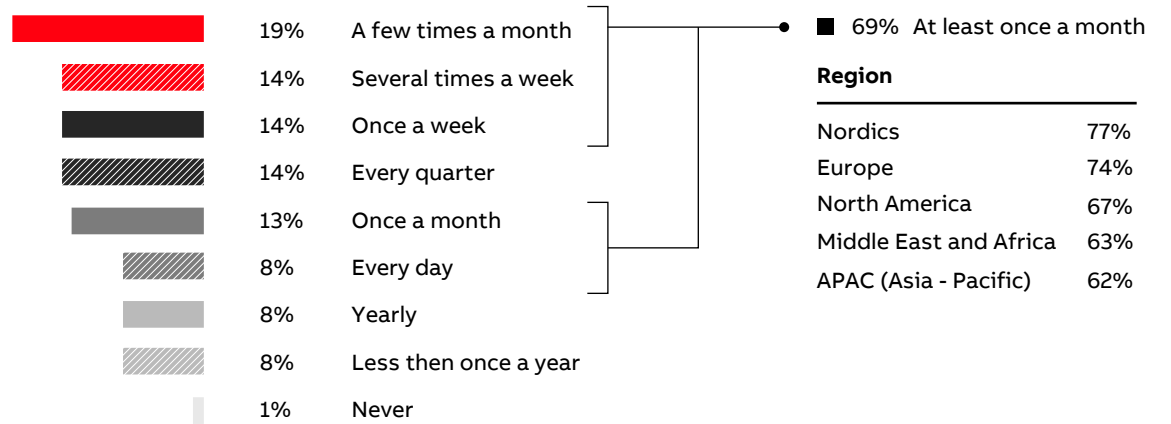
Reliability matters



Reliability matters

Reliability and uptime

Respondents from across most of the sectors surveyed listed downtime as occurring frequently, with 69 percent of plants experiencing unplanned outages at least once a month, and 8 percent an outage every day.



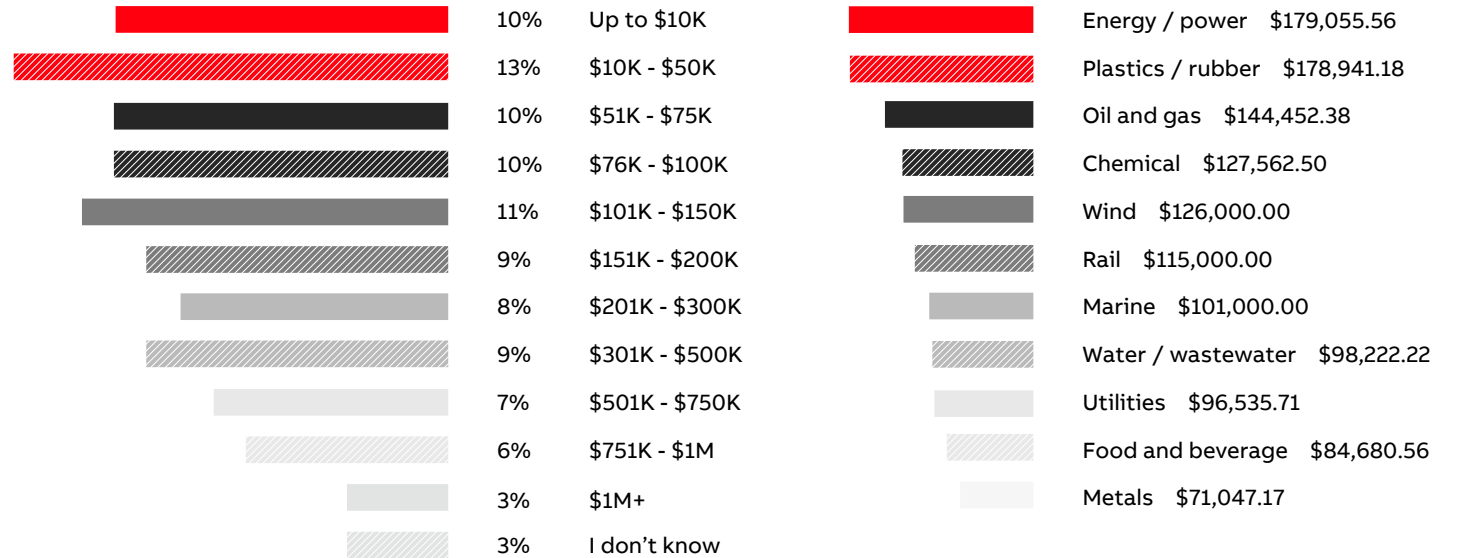
How often does the plant or site you manage experience unplanned outages on critical equipment?

Reliability matters

The cost of downtime

median **124,669 USD** per hour

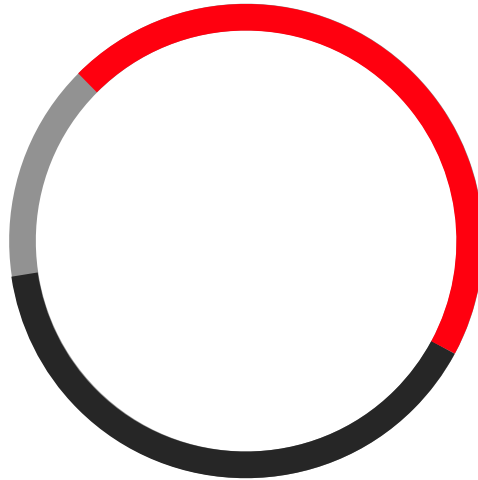
Aside from safety or environmental mishaps, unplanned or unscheduled downtime represents one of the costliest events in any industrial or manufacturing facility. By calculating the median value, we found that outages cost the typical industrial business a hefty \$124,669 USD per hour. The variations between regions are likely influenced by the relative labor cost in these regions. Differences by sector could be regulatory, as well as being related to the cost of lost production and raw materials.



Reliability matters

The cost of downtime

Run-to-fail maintenance involves addressing issues only when equipment malfunctions or breaks down. This leads to unplanned downtime, disrupted operations, and can halt production entirely. The unplanned outages that occur once a month on 69 percent of plants or sites mentioned earlier, jump to 80 percent for businesses that use a run-to-fail maintenance strategy.



- 45% Time-based preventive maintenance
- 33% Condition-based (predictive) maintenance
- 21% Run-to-fail strategy

What sort of maintenance strategy do you have?

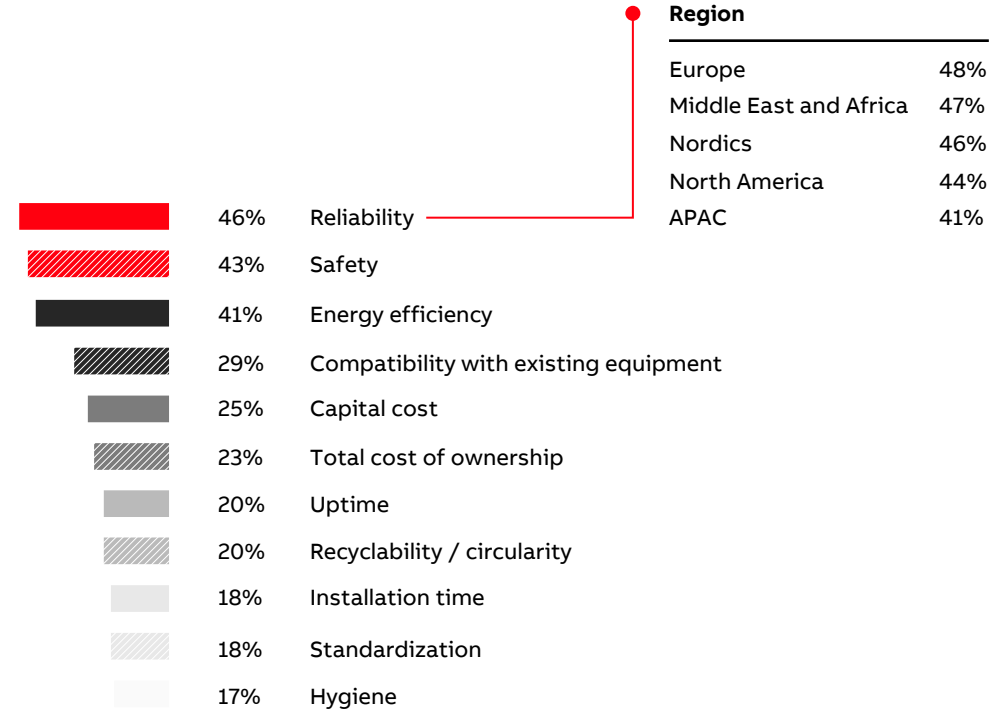
Reliability matters

Priorities during procurement

We surveyed people on their top three priorities when purchasing new equipment. Many of these are interlinked, with several of the factors influencing total cost of ownership, for example. But it’s interesting to see what comes top-of-mind for plant maintenance decision-makers.

Most respondents are prioritizing reliability, safety, and energy efficiency. Yet while reliability was listed as the top priority when purchasing new equipment, this doesn’t flow through to maintenance strategies, as we found out later in the survey.

One interesting point was that there was no significant difference between the number of people prioritizing capital cost (25 percent) to those prioritizing total cost of ownership (23 percent). This shows the tendency towards short-term thinking during procurement.



When you purchase new equipment, which of these are your top priorities?

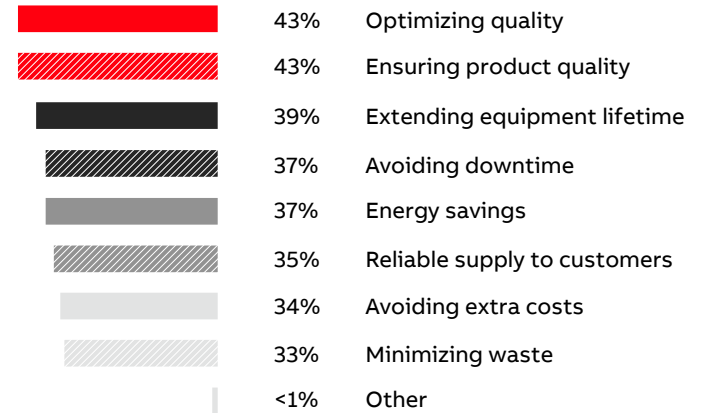
Reliability matters

The benefits of maintenance and reliability

The main benefits companies feel they get from their maintenance activities are optimizing productivity and ensuring product quality (both 43%).

The perception of these varies significantly between age groups though. Decision-makers aged over 45 view reducing downtime as the primary benefit (55 percent) compared to only 32 percent of those younger than 45. Conversely, younger individuals place greater emphasis on product quality and optimizing productivity, both perceived as top benefits by 43 percent.

Moreover, younger generations find reducing waste a bigger benefit (35 percent) than the older generations (24 percent). Similarly, only 32 percent of older individuals view energy savings as a main benefit of maintenance compared to 40 percent of the younger group. Contrary to expectation, this perception didn't vary by job seniority, so is more of age-related effect – related to generational attitudes to sustainability.

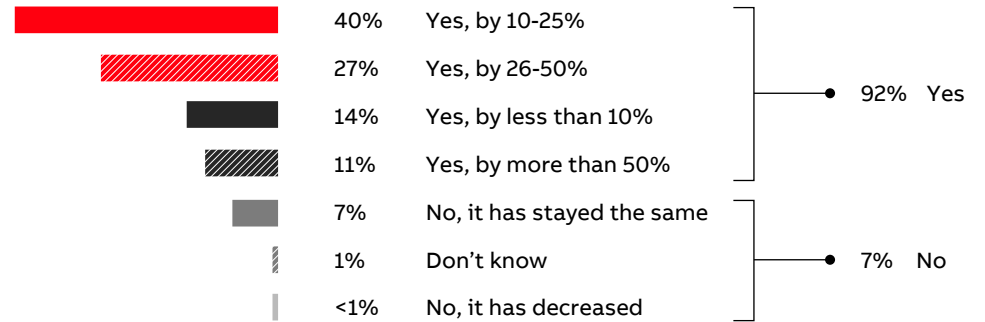


In your opinion, what are the main benefits you get from your maintenance activities?

Reliability matters

The benefits of maintenance and reliability

In the survey, 92 percent reported that maintenance has increased their uptime, with 38 percent reporting that uptime has increased by more than a quarter. Users of condition-based maintenance reported a 42 percent increase in their uptime from last year, a marked improvement over the 35 percent increase observed among those who apply time-based maintenance strategies.

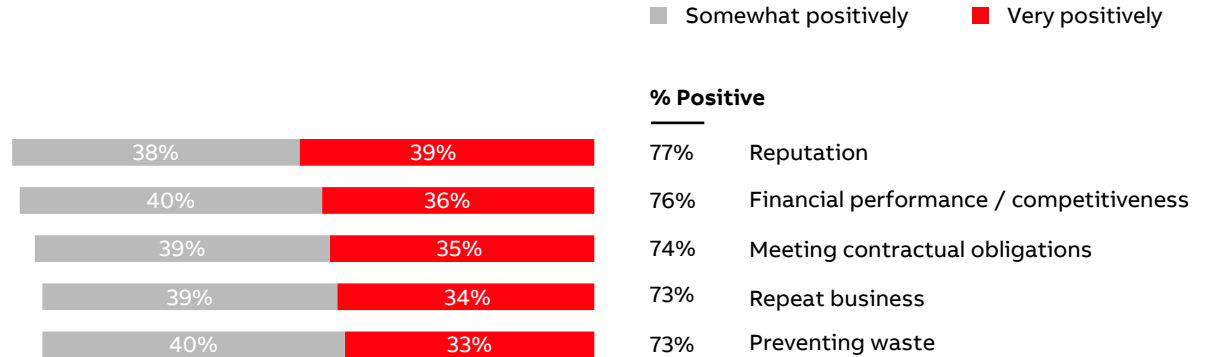


In the last year, has maintenance increased your uptime?

Reliability matters

The benefits of maintenance and reliability

A significant majority of survey respondents (77 percent) acknowledge that their equipment’s reliability has a favorable impact on their business reputation and their financial performance / competitiveness (76 percent). Looking ahead, some companies might consider implementing contractual mandates related to uptime. This could potentially be a requirement to win business. For example, a supermarket may require a certain level of uptime from a food manufacturer in order to meet customer demand. Outcome-based models effectively fulfill such requirements, enhancing the manufacturer’s capability to win more contract tenders.

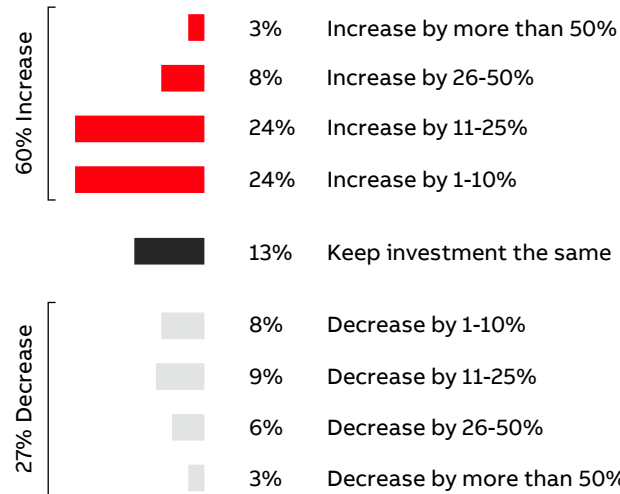


How does your equipment’s reliability positively or negatively impact the following aspects of your business?

Reliability matters

Increasing investment in reliability

A notable three out of five (60 percent) respondents intend to increase their investment in reliability and maintenance over the next three years. A third plan to boost spend by more than 10 percent. Among sectors, the water and wastewater sectors are most likely to do this (69 percent), compared to the plastics and rubber sectors who are the least likely (48 percent). Furthermore, the US (69 percent) and the UK (70 percent) plan to boost their investment in reliability the most, compared to Australia (46 percent) and France (51 percent) the least.

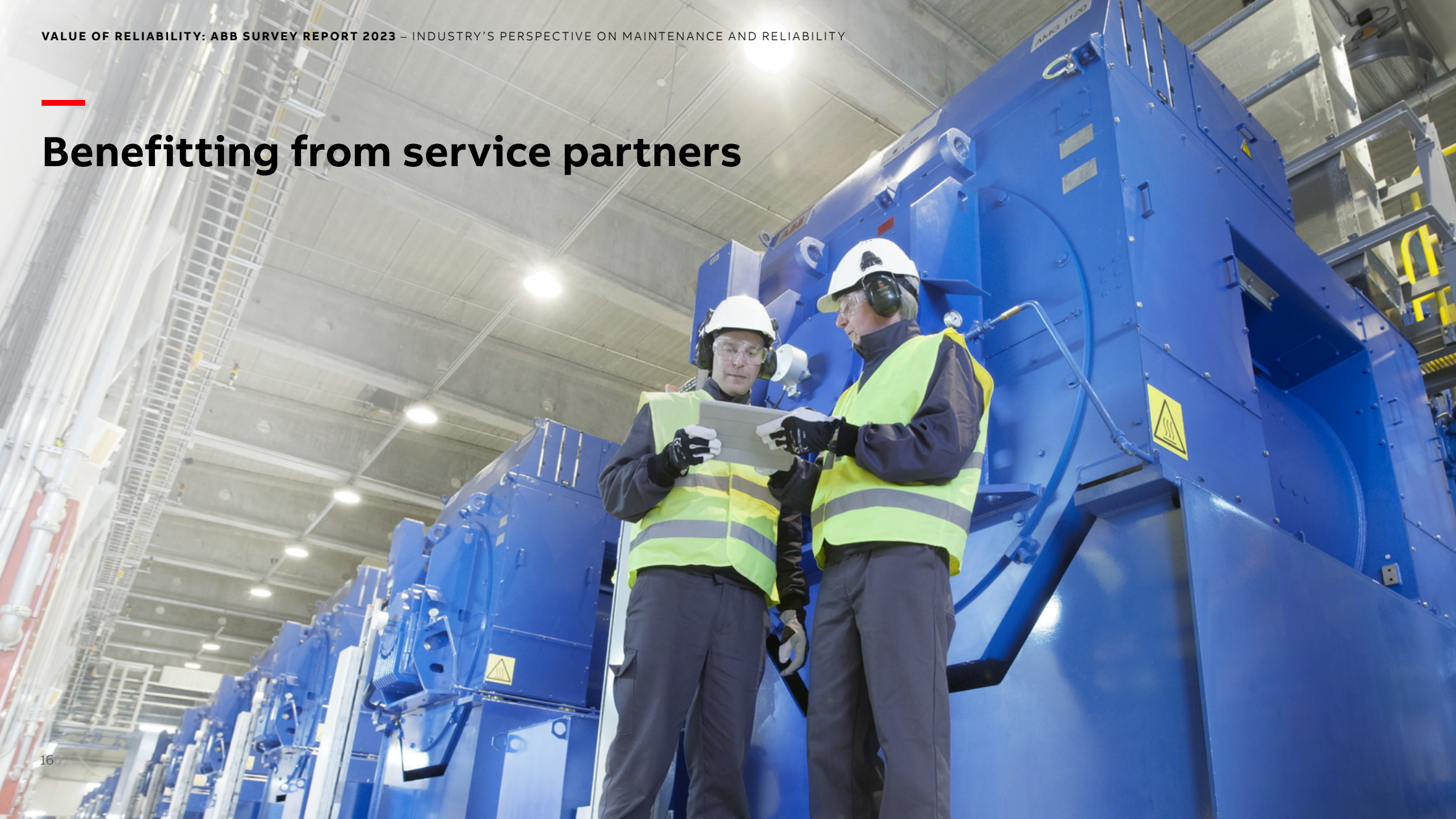


Region	
North America	66%
Middle East and Africa	64%
Nordics	58%
Europe	58%
APAC	57%

Sector	
Water/wastewater	69%
Chemicals	67%
Food and beverage	64%
Energy/power	60%
Metals	60%
Utilities	59%
Oil and gas	57%
Rail	57%
Marine	53%
Wind	50%
Plastics/rubber	48%

By how much are you planning to increase or decrease your investment in reliability and maintenance in the next 3 years?

Benefitting from service partners



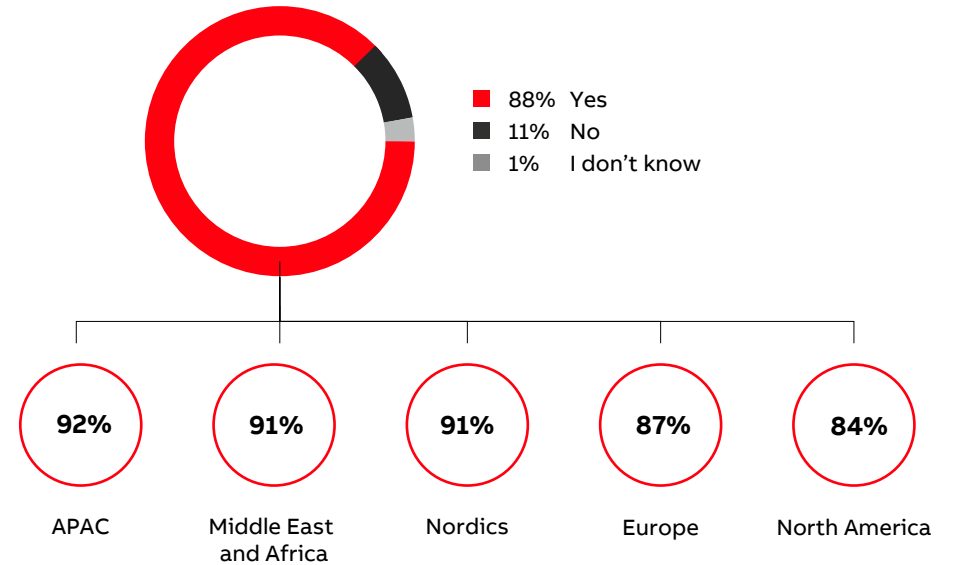
Benefitting from service partners

Service partnerships

Presently, 88 percent of respondents have established partnerships with a service provider, revealing a consistent trend regardless of country or sector. However, those without a defined maintenance strategy were far less likely to be working with a service partner (69 percent).

Respondents working with a service partner felt that their equipment's reliability more positively impacted their:

- Reputation
- Financial performance
- Ability to meet contractual obligations
- Waste prevention
- Repeat business

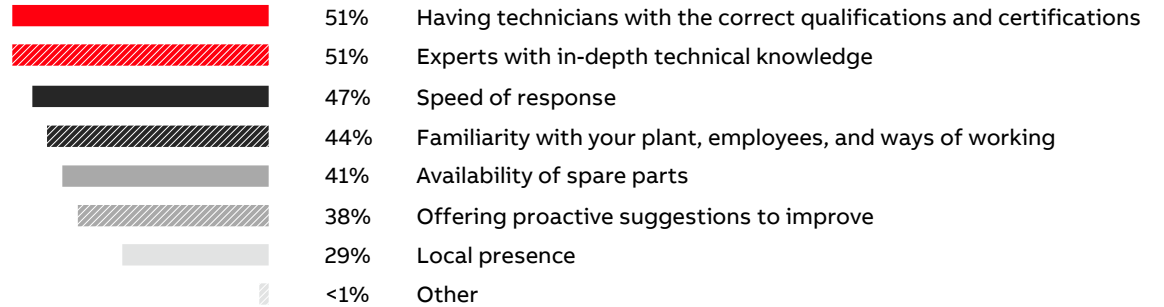


Do you work with a service partner for your maintenance strategy?

Benefitting from service partners

Service partnerships

Most of all, those surveyed appreciate service partners who can deploy technicians with the right qualifications and experts with in-depth technical knowledge. Indian respondents valued experts with technical knowledge 11 percentage points higher than the average. German respondents valued it 7 points less, but valued speed of response 10 points more than the average. A local presence was particularly valued in Sweden (12 points over average), more than in Turkey (11 points under average).



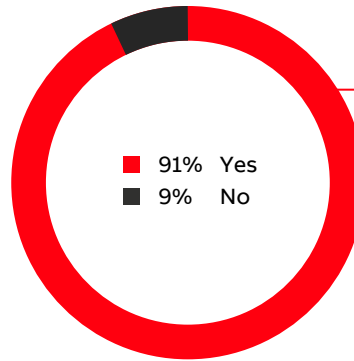
What would you most appreciate a service partner offering?

Benefitting from service partners

Maintenance agreements

A significant 91 percent of those surveyed have maintenance arrangements in place. This percentage climbs even higher in the Nordics.

The preferred duration for maintenance agreements is either annual or 2-5 years, both indicated by 40 percent of respondents. Predictably, the duration of maintenance agreements respondents currently have and the durations they deem ideal were similar.

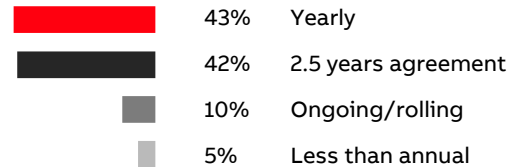


Region

Nordics	95%
APAC	94%
Middle East and Africa	93%
Europe	91%
North America	86%

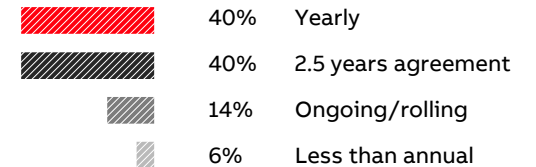
Do you have a maintenance agreement in place?

Current



What length of maintenance agreement do you currently have?

Ideal



What would be the ideal length of maintenance agreement for you?

Benefitting from service partners

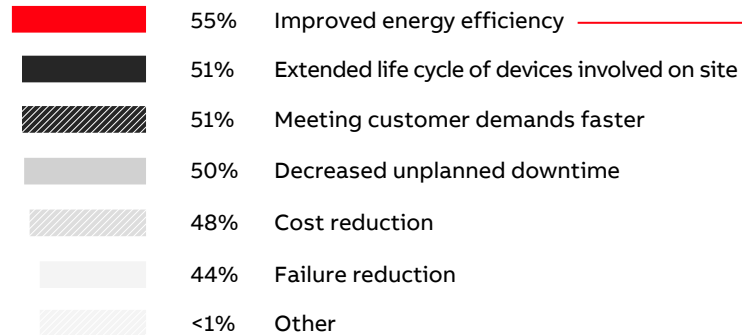
Maintenance agreements

The main benefit that companies expect to see for their maintenance investments is improved energy efficiency (55 percent). However, this perspective varies across sectors. Notably, the water sector expects energy efficiency to be a massive benefit (77 percent), whereas the plastics/rubber sector ranks it lower at 47 percent.

When it comes to reducing unplanned downtime, the wind industry views it as the biggest benefit of investing in maintenance (65 percent) while the marine sector perceives it as the smallest benefit (45 percent). Interestingly, cost reduction is perceived as the least significant benefit for the wind sector, with only 29 percent viewing it as a main advantage.

Moreover, those aged 45 and above perceive reducing downtime as the biggest benefit of

investing in maintenance (66 percent), while regarding energy efficiency as the smallest benefit (46 percent). This compares to 49 percent and 55 percent respectively for those younger than 45.



Sector	
Water/wastewater	77%
Oil and gas	58%
Energy/power	57%
Utilities	57%
Wind	56%
Food and beverage	55%
Rail	53%
Metals	51%
Chemicals	49%
Marine	48%
Plastics/rubber	47%

What are the main benefits you would expect to achieve from investing in maintenance?

Future trends and perceptions



Future trends and perceptions

Outcome-based maintenance agreements

An emerging trend in maintenance services is the adoption of outcome-based service models. These models are structured and charged based on achieved outcomes – such as uptime or energy savings – rather than by a fixed schedule or individual service tasks. This approach aligns the interests of the customer and the service provider, so that both parties have the same objectives – to improve equipment uptime, reliability, performance, and efficiency.

A large portion of respondents (87 percent) expressed interest in an outcome-based maintenance agreement, with 39 percent indicating a high level of interest. Those from Saudi Arabia showed the highest interest at 96 percent, while even the lowest level of interest, observed by Germany, still stood at a substantial 73 percent. Furthermore, the energy and power sector expressed the

most interest at 91 percent, while the wind, plastics, and rubber sectors with a lower interest at 79 percent, remain significantly interested in outcome-based agreements.

A significant portion of respondents (60 percent) are planning to boost their investment in reliability and maintenance over the next three years. Companies should also consider incorporating outcome-based maintenance agreements as a strategic component within their 3 to 5-year plans.



Would you be interested in an outcome-based maintenance agreement?

Future trends and perceptions

Trends in maintenance

Companies are anticipating that circularity (67 percent) will have a significant impact on their future maintenance strategy, closely followed by energy efficiency (65 percent).

Respondents over the age of 45 feel that energy efficiency, and circularity will influence maintenance the most in the future (74 percent), compared to only 65 percent of those younger than 45. Conversely, they are less inclined to believe that technologies like augmented reality (41 percent) and digitalization (57 percent) will have a substantial impact, in contrast to those younger than 45 (49 percent and 64 percent respectively). The younger generation recognizes the importance of emerging technologies, underscoring the importance of adequately training these individuals to harness the full potential of such innovations.

Different sectors also perceive differences in maintenance trends. The utilities sector places the highest emphasis on energy efficiency (75 percent). Augmented reality is projected to have a more pronounced impact on maintenance in the food and beverage (53 percent) as well as the oil and gas industries (53 percent).



Region	
North America	71%
APAC	70%
Nordics	67%
Middle East and Africa	66%
Europe	65%

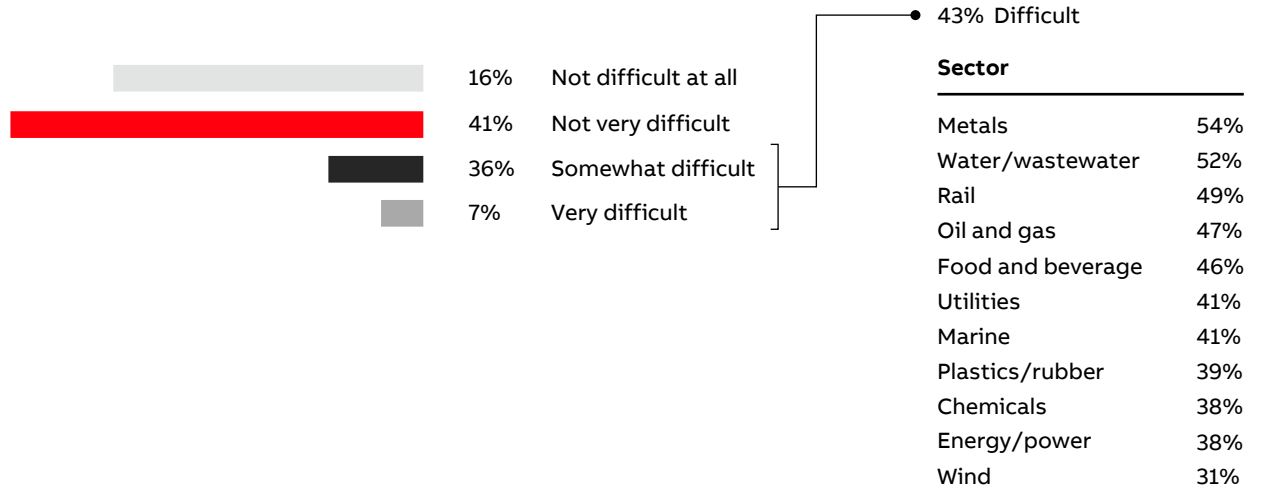
What trends do you think will impact your maintenance strategy in the future?

Future trends and perceptions

Skills gaps

A significant challenge facing industries today is the ageing workforce. The average age of maintenance staff surveyed is 37, with this trend remaining relatively consistent across various countries and sectors.

A substantial 43 percent of respondents expressed challenges in recruiting maintenance staff. From a demographic perspective, the UK faces the most significant hurdle at 59 percent, followed by Germany (55 percent), while Norway (31 percent) and Australia (32 percent) encounter comparatively fewer difficulties. Different sectors also display variations, with the metals industry finding it the most difficult at 54 percent, while the wind sector finds it the least at 31 percent. Considering this, fostering interest from the younger generation to join the manufacturing sector is critical.



How difficult is it for you to recruit maintenance staff?

Recommendations



Recommendations

Industrial businesses reported on the high cost and frequency of downtime they experience. However, they can take more control by implementing some key actions:

1

Audit the effects of downtime on your business. Understanding exactly how downtime affects your business is a good first step. What are the direct and indirect costs? What is your most critical equipment? What are the wider implications for your business?

2

Invest in reliability. Consider reliability a top priority when buying new equipment and invest in reliability-centered services – like modernization or reconditioning your equipment. For example, reconditioning a variable speed drive reinstates factory-level quality while also helping to avoid up to 80% CO₂ emissions compared to buying new.

3

Digitalize your equipment. Digitalizing your motor-driven equipment and applications enables service engineers to monitor their health and performance. This facilitates a shift to a lower-risk, condition-based maintenance strategy, where equipment is fixed based on its current condition, reducing failures.

4

Consider a long-term, outcome-based service agreement. Most businesses we surveyed plan to increase their investment in maintenance over the next three years, and almost all are interested in outcome-based servicing. Investing in a long-term, outcome-based agreement will offer cost efficiency, sustainability, competitiveness and peace of mind – empowering businesses to focus on their core competence.

Now is the time for decision-makers to reevaluate their approach to maintenance and reliability, and consider the business case for a long-term, outcome-based maintenance strategy.

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Industry's perspective on maintenance and reliability

