Next-Gen Industrial AI

Regional Spotlight: Europe

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Next-Gen Industrial AI: Caution, Conservatism and Competition

Europe is well-positioned to be a world leader in the use of AI in industry, but the next generation of AI will create scenarios we've not encountered before – particularly in how AI and humans work together. Some of these scenarios not only require completely new processes, but also an important mindset shift: we have to be prepared to extend our confidence in digital capabilities to tasks that have only ever been assigned to people.

To investigate the shift toward the next generation of industrial AI, we conducted a survey of 515 senior leaders. Each respondent needed to be responsible for, involved in, or knowledgeable about their organization's existing or planned use of AI. Here, we discuss some of the findings from the 148 respondents in Europe; the overall findings have been published in our Next-Gen Industrial AI report.

Greater benefits are expected

Our Europe respondents are expecting a big increase in the benefits of AI over the next three years. These include using AI to automate quality control; to improve existing products; to automate responses to emergencies; and to identify risks. Each of these benefits is expected to benefit roughly twice as many organizations by 2022 as today.

That kind of progress would be impressive on its own, but what is interesting is that other regions – including North America and Asia-Pacific – are anticipating bigger jumps.

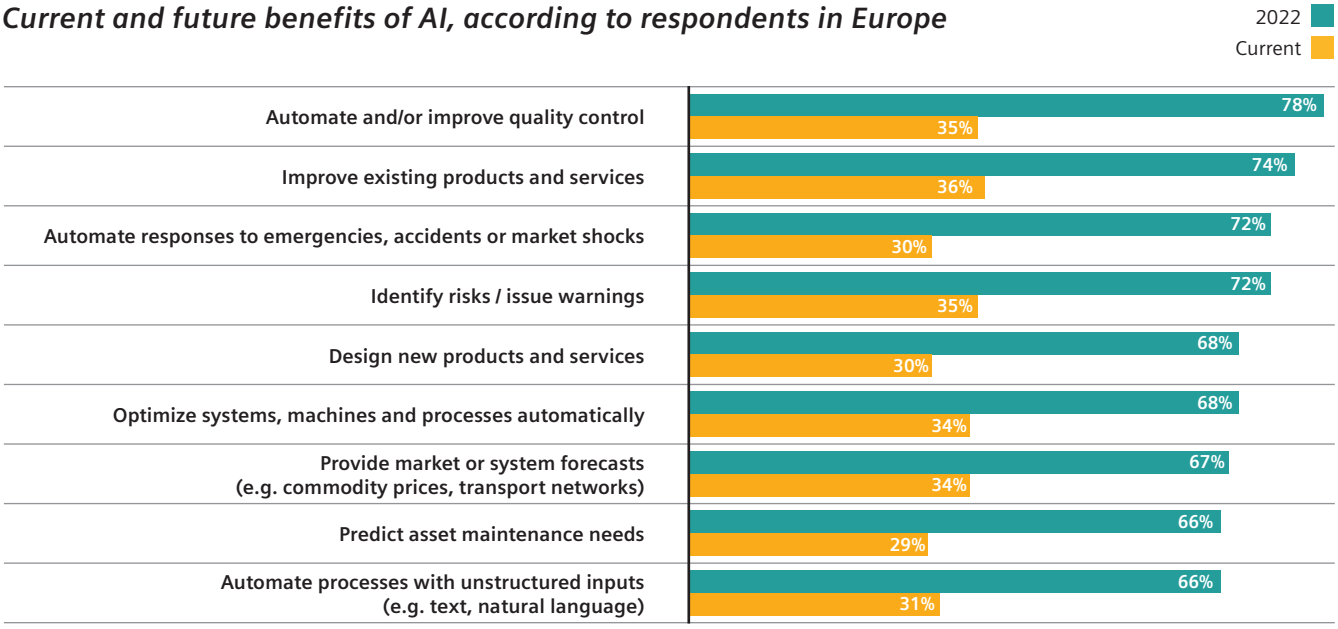
Europe respondents' conservatism here could be because they expect to make less progress in overcoming barriers to AI adoption. The most difficult of these barriers, by 2022, all relate to threats and unintended consequences: cybersecurity, liability, and safety risks.

These kinds of concerns are natural as businesses automate anything that is high value or potentially dangerous. AI allows us to automate areas that have only ever been under human control, and it has to earn our trust. However, businesses also need to make sure that progress is not blocked by unreasonable or irrational prejudices.

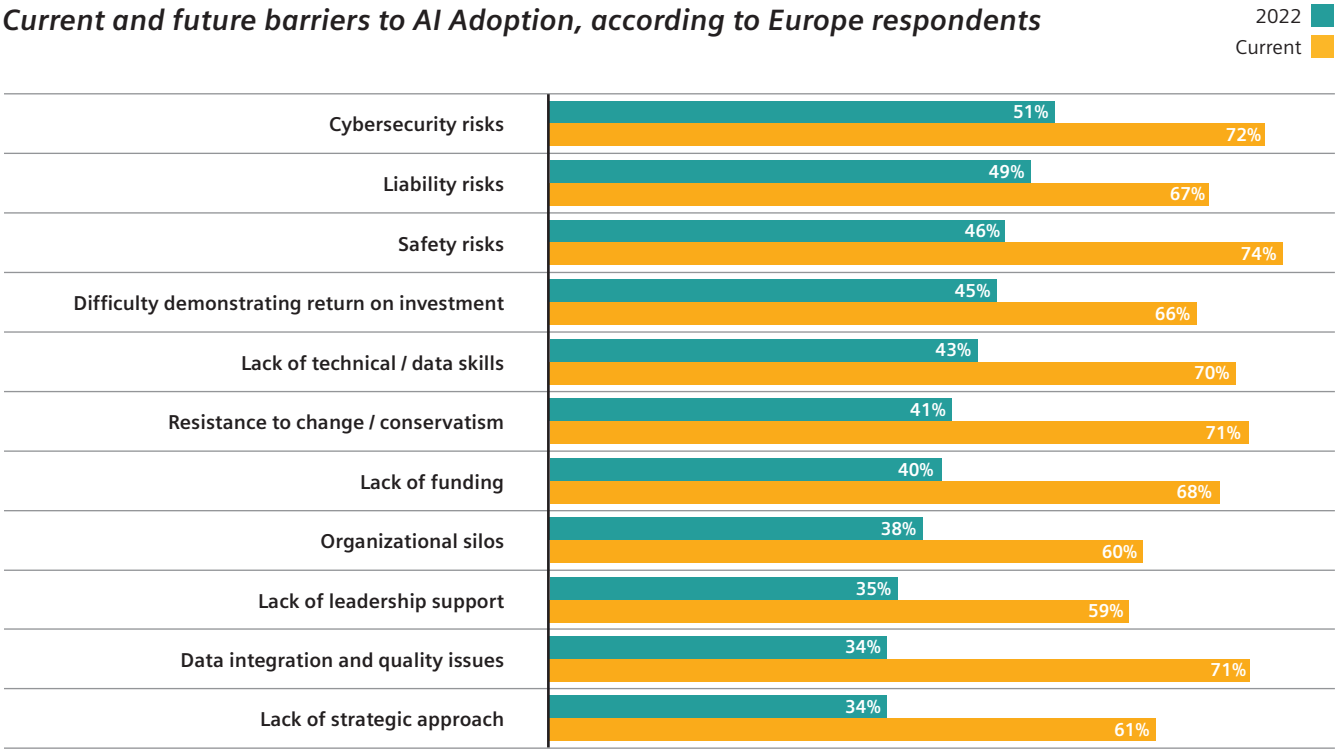
AI in a post-covid world

When this research was commissioned, there was a lot of hype around the potential of consumer AI, and fewer insights available on industrial AI. While we at Siemens, with over 30 years' experience in industrial AI, are no strangers to this field, we wanted to learn more about the experience of other organizations. This research sought to uncover the benefits and barriers of industrial AI applications, and to highlight its potential, especially when combined with other technologies like IoT and digital twin. Suddenly the world is a different place. However, as organizations seek to recover, rebuild and adapt in a post-covid environment, the potential of industrial AI is more relevant than ever.

Current and future benefits of AI, according to respondents in Europe



Current and future barriers to AI Adoption, according to Europe respondents



AI model vs. experienced employee

For example, industrial company leaders may soon be in situations where they need to decide whether to follow the recommendations of experienced colleagues or powerful AI models – they may not always agree. If leaders have a bias one way or the other, it could limit their ability to make the best choices.

To explore this kind of scenario, we asked respondents to imagine their organization has an impressive AI model – trained on 20 years of performance data – that recommends major refurbishment work on the company's machines. Doing the work would be expensive and cause significant delays. However, according to the model *not doing the work* risks a much more costly and disruptive repair.

Respondents were then asked to imagine that their head of operations – a 20-year veteran of the industry – strongly disagrees with the model, and claims that the refurbishment work would be a waste of money.

We asked Europe respondents how they would make their decision, and there is an almost even split: 51% say they would take the recommendations of the head of operations, and 49% the AI model. In other regions, there is a strong tilt toward the AI model. In Asia-Pacific, 60% go with the AI model, and it is similar in North America (41% to 59%).

Perhaps this is healthy caution from European organizations – particularly given their concerns about the risks. But it also indicates that some organizations have an aversion to change. Some might even have a specific bias against AI and automation.

What is AI?

In this report, and the research that supports it, 'artificial intelligence' and 'AI' refer to a broad spectrum of methods or technologies that perform tasks which would normally require functions of human intelligence such as learning, judging, and problem-solving. This is more in keeping with the contemporary business understanding of AI than any technical or academic conventions.

Decision time: Does AI need to outperform humans?

In another scenario, we asked respondents to consider what level of predictive accuracy, relative to a group of human employees, they would like to see from an AI model before giving it control of operational settings. The human employees were able to add value with five out of 10 of their predictions.

You can make a strong argument for the case that we should switch to the AI model at equivalent performance (i.e. five out of 10), because this saves the time and effort of the human employees, who could be directed to other tasks[1]. The more outperformance respondents want from the AI model (six out of 10 or higher), the more likely it is that other factors, such as biases and emotions, are involved.

In our overall results, for all regions, just 10% of respondents are willing to hand over control when the AI model exactly matched the human employees. Most respondents (48%) want to see the AI model do just a little better than the humans and add value in six out of 10 predictions. The remaining 42% want even greater outperformance.

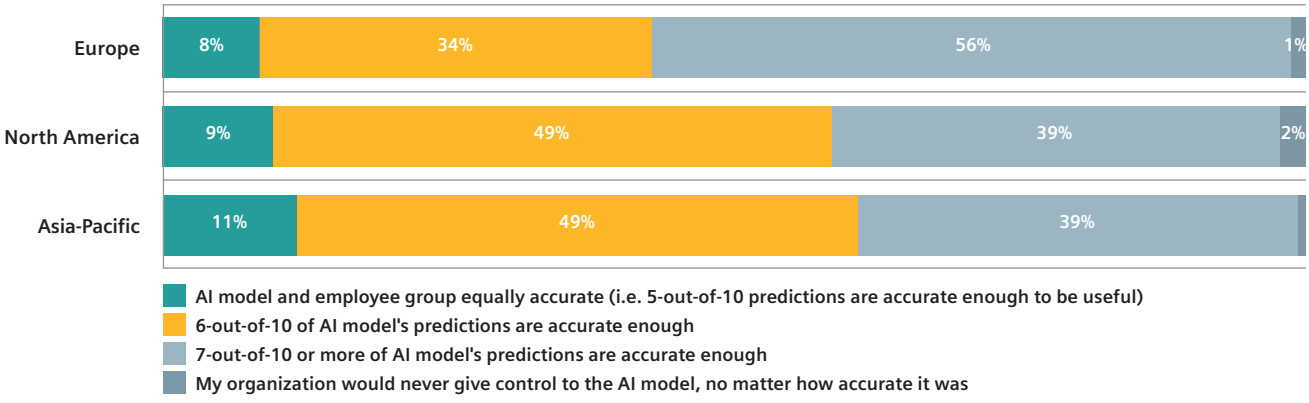
Again, Europe respondents are more reluctant than those in other regions to give up human involvement. Just 8% are happy with equal performance, 34% think that six out of 10 is sufficient, and 57% want greater outperformance.

In Europe, caution could block benefits

This reluctance suggests that Europe respondents are in general less open to AI-driven automation than those in other regions. This creates an interesting tension: all organizations need to find a balance between rushing recklessly into unknown territory and letting unreasonable caution erode competitiveness.

In Europe, our research suggests the risk is more of the latter than the former, and so industrial organizations should be sure that any limitations on the use of AI are made based on strong, evidence-based reasons.

How much accuracy do respondents need from AI before they give it control?



ABOUT THE RESEARCH: Siemens and our research partner Longitude conducted primary research[2] into the uses of, attitudes to, and outlooks for AI in industrial organizations. We surveyed 515 senior business leaders in the energy, industrial/manufacturing, urban infrastructure, and transportation sectors. The research included respondents from North America, Latin America, Europe, the Middle East and Africa, and Asia-Pacific and was concluded in September 2019. All respondents were from organizations with an annual revenue of at least $100 million. In order to qualify for the survey, respondents needed to be responsible for, involved in, or knowledgeable about their organization's existing or planned use of AI and related technologies, strategies, budgets, and applications.

[1] For simplicity, this scenario ignores capital costs needed to create the model. Instead, the question assumes the investment is sunk before our scenario begins. Operating costs of the model are assumed to be lower than the ongoing time spent by the employee group, though this was not explicit in the survey question.

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