

# AI's Implications for IT Leadership

**A**I implementation will have a significant impact on C-suite technology leaders, particularly CIOs, chief data officers, and chief analytics officers. Developing the capabilities required for production AI will influence IT road maps, software development and deployment processes, and how the organization treats data.

## Sharpening Focus on Critical Technology Competencies

Most respondents reported that they are still developing foundational technology capabilities that are key to realizing the benefits of AI applications: cloud/data center infrastructure, cybersecurity, data management, and development processes and workflow. As organizations move up the AI implementation curve, they are more likely to report mature capabilities in these areas (see Figure 7, “AI Implementers Report Most Mature Technology Capabilities”).

These are clear indications that CIOs and C-suite technology leaders must have a plan for increasing these capabilities.

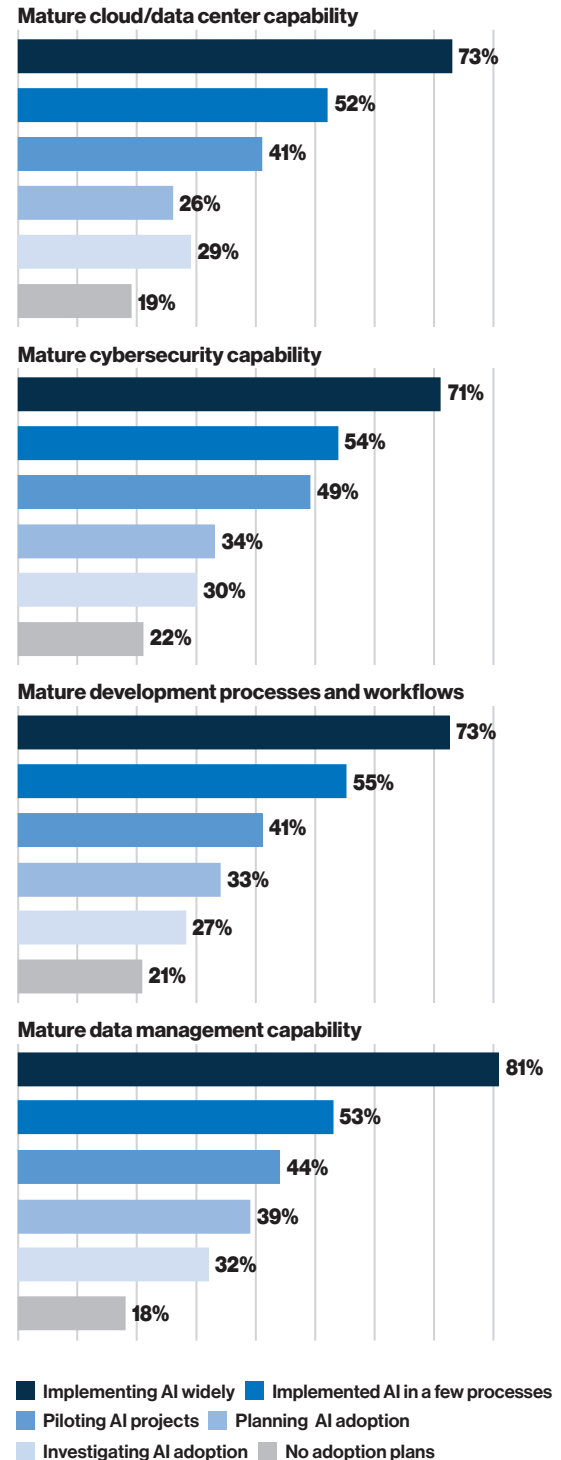
“You have to work closely with your CIO,” says Capt. Michael J. Kanaan, co-chair for artificial intelligence at U.S. Air Force headquarters. “We’re talking about simple things here. If the cloud isn’t there, you’re not going to do this very well. If the data sets aren’t there, you’re not going to do this very well. If you’re not making good choices on your DevSecOps” — as the Air Force refers to DevOps that keep security concerns in focus — “it’s not going to work. AI is at the top of that big, big iceberg.”

Cloud services in particular are a critical asset for AI, says Eric Monteiro, senior vice president and chief client experience officer at Sun Life. Paying for on-demand cloud computing resources is more cost-effective than buying and operating the computing infrastructure required by AI. It also offers the global financial services and insurance company more flexibility to serve different business units according to their individual needs and to access the latest technologies.

“The computing models and the solutions are all more flexible with the cloud,” Monteiro says. “Having our infrastructure in the cloud allows us to provide for the different needs of each business without having to buy the whole thing. And the cloud enables us to use the latest and greatest tool kits. There’s no way we could buy all those tool kits, and manage and certify them, in a way that’s fast enough for the needs of our analytics community. Going to the cloud means someone else is doing that.”

**Figure 7: AI Implementers Report Most Mature Technology Capabilities**

Advancing certain technology capabilities — cloud/data center, cybersecurity, data management, and development processes and workflows — may build a foundation for successful AI implementations.



Whether it's computing resources, DevOps, or new technologies for experimenting with different algorithms and data, AI practitioners are pressing IT to respond, says Astrid Undheim, vice president of analytics and AI at Telenor Group, a Norway-based telecommunications company.

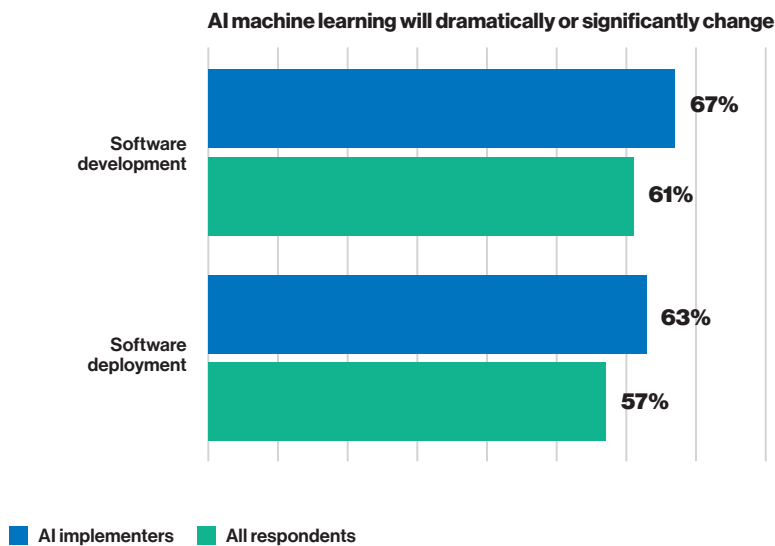
“From my perspective, I think that AI and machine learning experts are putting quite high demands on IT, more demand in terms of agility in IT,” Undheim says. “The difference between IT that works and IT that doesn't work for machine learning is quite big. And for telcos that have traditionally outsourced a lot of IT, it is demanding to make the IT infrastructure agile enough.”

**AI Changes How Software Is Developed and Deployed**

Respondents to our survey strongly indicated that they see AI changing software development and deployment processes. Sixty-one percent said they see AI driving significant or dramatic changes to software development processes, with 57% expecting it to similarly influence software deployment processes (see Figure 8, “AI Drives Changes in Software Development and Deployment Processes”). And those who have already implemented AI are more likely to report a strong impact on both software development and deployment.

AI brings significant change compared with traditional technology implementations because the deployment process is dynamic, requiring continuous monitoring and retraining. Managing these systems requires ongoing management of the predictive AI and machine learning models a company develops, not just before but also after they have been deployed. It means being ready to make improvements and corrections to these models, says Ray Wang, principal analyst, founder, and chairman at Constellation Research.

**Figure 8: AI Drives Changes in Software Development and Deployment Processes**



The majority of respondents expect AI to require changes in how they develop and deploy software. Those with experience implementing AI are even more likely to hold this view.

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“You're always collecting data, and you're always refining the model; this isn't something that's static. You also have to make sure that once you train the system, you can also ‘un-learn’ the system,” Wang says. “You have to be able to take corrective action. If a pattern that's assumed to be correct is incorrect, how do you retrain the system?” Leaders need an answer to this question, he says.

Machine learning and AI algorithms are designed to improve results as additional informative data goes into them. Tests can show that a predictive model works well, but even then, it still requires ongoing maintenance, says Linda Zeger, founder and principal consultant at the data analytics and system design consultancy Auroral LLC. “When you start putting [models] out there, things change, and over time they

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may not work as well. This is how it is really different than a typical software development process. The training and testing processes should continue as the environment or operating conditions change,” Zeger says.

One vivid reason for the need to constantly reevaluate AI and machine learning models is that the initial model is unlikely to incorporate all the variables in a situation in which it is taking actions or account for how users will interact with the AI system over time. Zeger points to self-driving cars as an example. Test drivers can be told that the car will automatically brake if it senses a pending collision but that if for any reason the car fails to behave as expected or is unsafe, the driver is expected to serve as a backup operator.

But even if the cars perform perfectly in a test environment, the results can change when a consumer gets behind the wheel, Zeger says. “Once somebody owns such a car, they might become complacent and accustomed to the car braking for them. They might start losing patience and they think, ‘The car is doing pretty well. I don’t really have to watch it so much.’ So they react differently, and now the success of the self-driving car as a whole may not be as good. At this point, you would need to retrain and reevaluate the car/driver system.”

This scenario, Zeger says, illustrates the human factor involved. “It’s a little different than a typical software project in that, even once it’s deployed, the human interaction with it can change. And so the models you originally have might become outdated,” she says.

### How Data Is Influencing Software Development Practices

The demands that AI places on an organization — the need to manage data holistically and proactively — has influenced software development practices and increased the need for business-IT collaboration on architectural strategies, experts and practitioners say. There is a greater awareness of how the data that flows throughout the organization applies to all software development, not just the development of machine learning and AI models, as enterprises plan for the future use of the data they collect and generate.

This shift in attitude and approach has also influenced IT staffers, Monteiro says. “The folks who design applications in IT, they don’t just think about applications now; they also think about the data. They now see that the applications they’re creating or designing create data that’s going to be used later in the process. This just wasn’t true 10 years ago. So if it’s an application process or a website design or whatever, data quality is now a core part of that design principle.”

AI development also requires more — and earlier — business and IT collaboration than traditional application development, Monteiro says. Choices about aspects of AI such as computing architecture, how the data will flow in a particular application, how the new AI system will change business processes in various parts of the company, how people will interact with the systems through user interfaces, and more are now part of early-stage talks.

“It’s raised the bar on up-front alignment between the business and IT on architecture, and data and API strategies,” Monteiro says. “It creates a lot of complexity early on in projects. In fact, one of the things we found is that projects slowed down in the beginning because there was a lot of alignment required. Lots of questions came up that never would have come up before. But then, when it’s time to use the data, we’ve accelerated it because we answered a lot of the earlier questions when we had these discussions,” he says.

This means that business experts need to understand more about how technology works, just as technology experts need to be smarter about business when discussing AI projects, Monteiro says. This cultural shift requires IT leaders to be comfortable with business colleagues’ questions about details, down to the technology functions, data, and computing architecture that support them. “Historically, business leaders wouldn’t be bothered about whether this is in that database or this database. But now they do, and it does matter,” he says.

**Sharing Responsibility for the Organization’s Data**

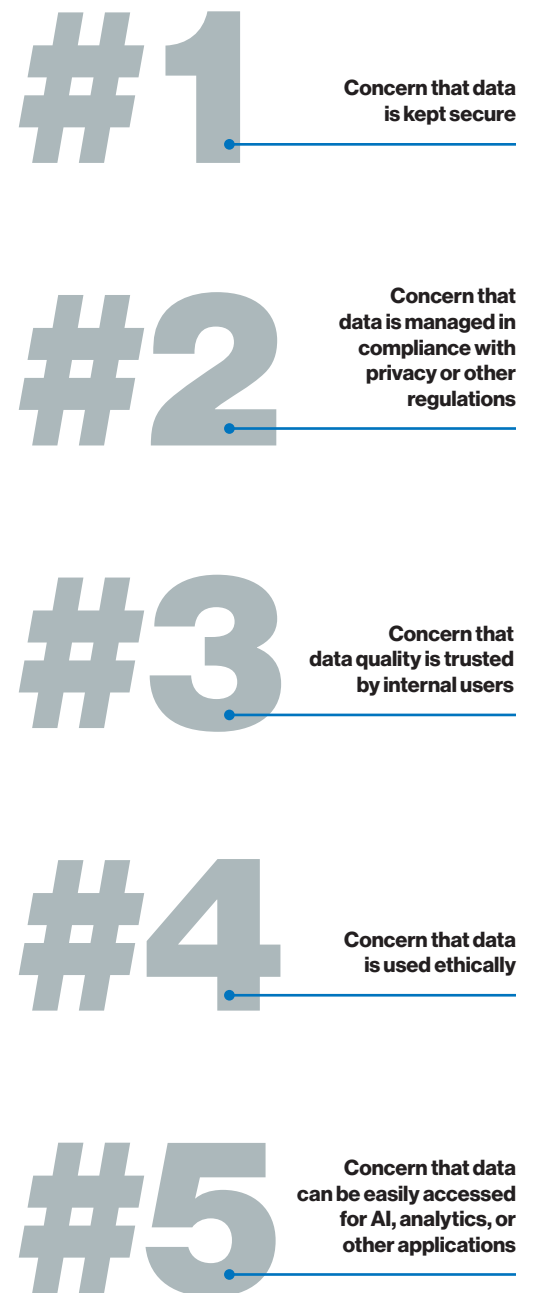
Data governance is an important component of an AI-ready data strategy, but our survey found formal data governance efforts among just 46% of respondents. AI implementers, in contrast, are far more likely to have a data governance program: 74% of those with broad implementations of AI and 62% of those with point implementations of AI reported engaging in these efforts. All respondents, including AI implementers, are still driven by security and regulatory compliance, while data access, data quality, and data ethics appear to be lesser concerns (see Figure 9, “Security and Compliance Still Top the Rankings of Issues That Drive Data Governance”).

Nonetheless, the drive to implement new technologies is pushing more activity in quality, governance, and accessibility. A majority of respondents said they are doing more in data security (64%), data quality (61%), data privacy and accessibility (each 58%), and data governance (57%).

Who is responsible for data governance varies widely, according to our survey data. About 40% of respondents said the CIO or CTO is accountable for data governance, but responses from the other 60% revealed a range of other approaches. Even in organizations where there is shared responsibility or it is assigned to another C-suite executive, the structures and systems required for data governance will inevitably be part of the technology leader’s agenda. Regardless of who is ultimately accountable, different aspects of governance may be assigned to different groups, centralized, or assigned to business leaders.

At global information services provider Equifax, data governance essentially operates with three lines of defense. At the first level of defense, business units, the data and analytics center of excellence, data stewards, and users

**Figure 9:** Security and Compliance Still Top the Rankings of Issues That Drive Data Governance



Despite the growing spotlight on issues such as data quality, data ethics, and data accessibility, all respondents, including those with more-advanced AI practices, remain most concerned about security and compliance when it comes to data governance.

share responsibility for data access and governance. At a second level, internal audit is responsible for ensuring that all data policies have been implemented and executed. The third line of defense is provided by the corporate risk management team along with security experts, to ensure that data use is meeting the data governance guidelines for the entire enterprise, says Vickey Chang, vice president for data and analytics at the U.S. Information Services unit at Equifax.

### What's Working: DBS Bank Centralizes Governance

Governance over AI can be a sprawling effort, encompassing technology risk, compliance, privacy, and discussions of responsible, appropriate uses. DBS Bank has centralized all of those activities to streamline the review and approval process. Although that approach may not be practical for every enterprise, it is now easier for project leaders to gain the necessary sign-offs at DBS.

Chang works with a team of about 15 data scientists on predictive models that use neural networks that, for example, help financial institutions evaluate loan applications. Among her most recent projects: making neural network models, known as black boxes, explainable to regulators with oversight of the credit industry. This work involves building many statistical models, and Equifax's governance process is an internal check.

"If my team builds a model using multiple data sources, we will need to get all the proper data approvals to make sure we are using data in the right way to fulfill our customer requests," Chang says. A data stewardship and governance team assessment is conducted with each business unit that holds the data, to ensure that Chang's team is compliant with the data regulations (which can vary by country and industry) that apply to that business unit.

DBS Bank in Singapore established its Data First program two years ago as part of a strategic effort to drive data innovation and elevate data management and governance standards across the bank. It involves having a senior leader from each business unit serve as a data owner who is responsible for making sure that everyone is thinking about data strategically. All aspects of legal and regulatory requirements impacting data are also centrally managed under the center of excellence team for data headed by an executive director in the Legal, Compliance, and Secretariat group.

Centralizing the management of legal risk, regulatory compliance, data privacy, and oversight of appropriate use of data has also streamlined DBS's process of reviewing and approving AI and analytics use cases, says Lam Chee Kin, managing director and head of the Legal, Compliance, and Secretariat group. "You create one organization to handle the harmonization of data frameworks and to be a single point of advice," he says. In contrast, many other organizations set up separate units to oversee singular concerns such as data privacy, banking secrecy, competition law, outsourcing, legal risks, and so on, he says. "Because it's in different places, a person trying to run one data project ends up having to talk to multiple people. It can create a lot of operational complexity."

And as AI brings bigger questions about appropriate use of technology and data to the forefront, developing a formal yet streamlined process for evaluating use cases may become a strategic priority for leadership. ●

**Download the full research report,  
"How AI Changes the Rules," at [www.sas.com/MITreport](http://www.sas.com/MITreport).**