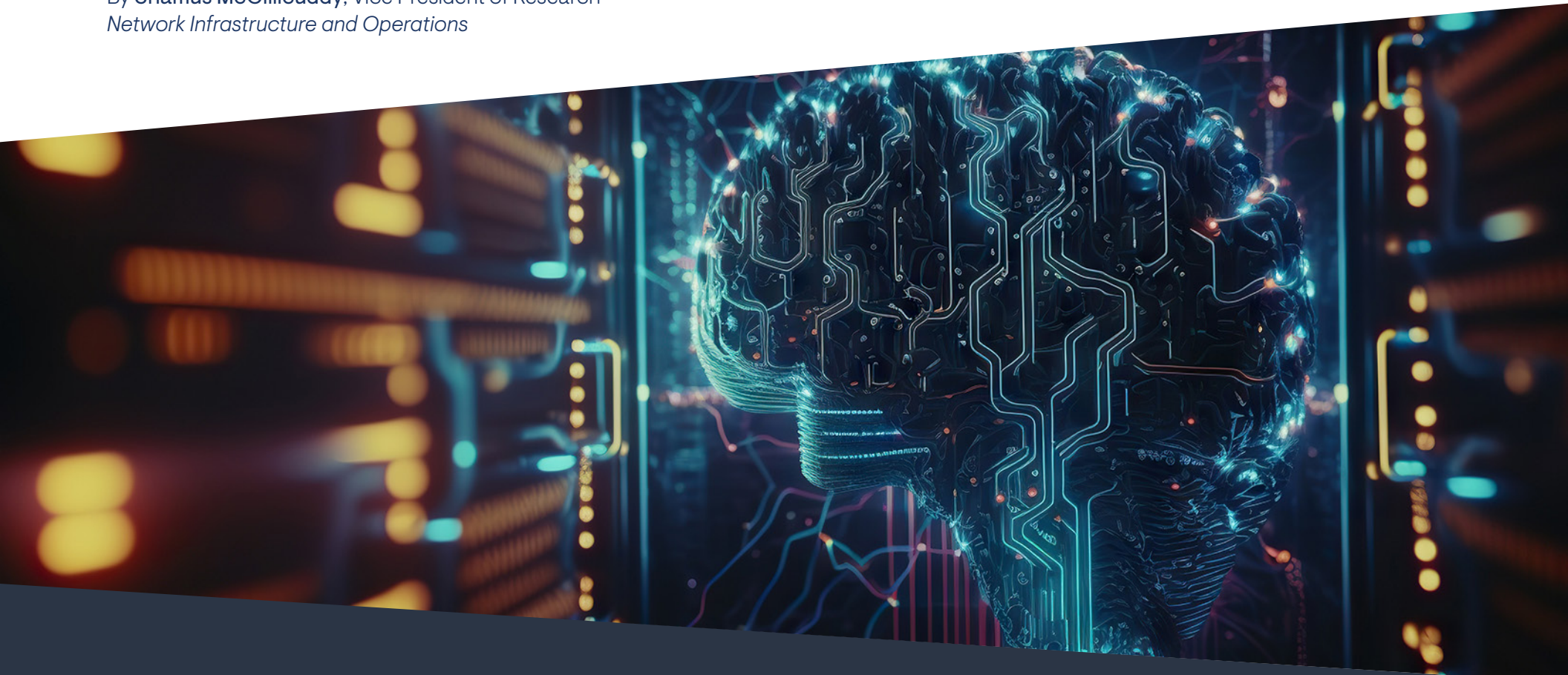


AI-Driven Networks

Leveling Up Network Management

April 2023 EMA Research Report Summary

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Network Infrastructure and Operations






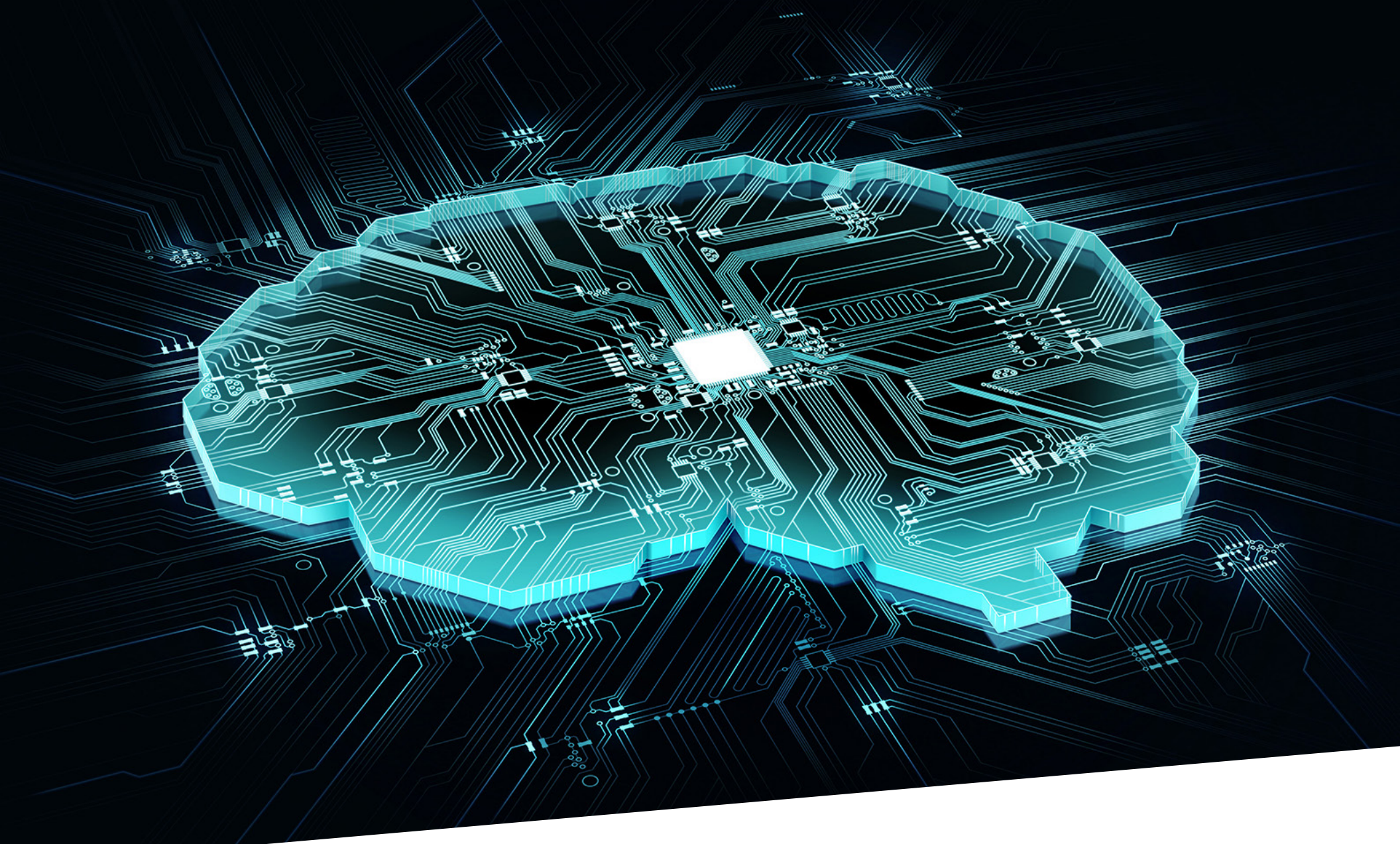
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Executive Summary

This new market research explores how IT organizations are improving network management with intelligent systems based on artificial intelligence (AI) and machine learning (ML). Sometimes known as AIOps solutions, these AI/ML technologies are helping organizations optimize

their networks, streamline operations, and reduce security risk. Based on a survey of 250 IT professionals, this report identifies how organizations are evaluating, implementing, using, and succeeding with AI/ML-driven network management.



Introduction

The practice of applying artificial intelligence and machine learning (AI/ML) algorithms to IT management gained mainstream acceptance over the last few years. Many – but not all – vendors and IT organizations have embraced the acronym AIOps (artificial intelligence for IT operations) to denote this phenomenon. Whether called AI/ML or AIOps, these technologies are gaining traction and delivering value.

Many IT organizations apply AI/ML and AIOps technology across domains, correlating insights from the various layers of IT infrastructure and operations. However, Enterprise Management Associates (EMA) continues to observe significant interest in applying these AI technologies narrowly to network management. Networks are notoriously complex, and network management is rife with manual processes and tool sprawl, making them a fertile domain for AI-driven transformation.

EMA research previously confirmed that IT organizations recognize the potential value of AI-driven network management. Two years ago, 90% of IT professionals told EMA that the application of AIOps to network management could lead to better business outcomes for their companies.

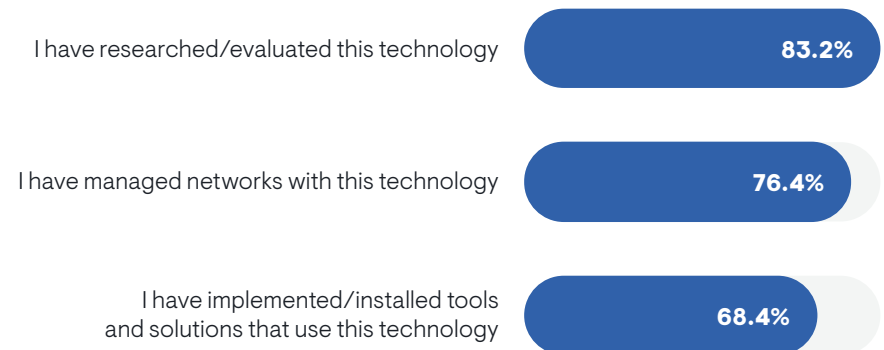
The key hurdle is to translate into reality this belief that AI-driven network management can improve business outcomes. IT organizations must learn how to evaluate and implement this technology. Then, they must convince potentially skeptical technical personnel to use it. Two years ago, only 41% of IT organizations believed they were fully effective at evaluating the AI/ML and AIOps technology they were considering for network management use cases, and only 30% considered themselves completely successful in their overall engagement with the technology at that point.

Two years later, with this new report, EMA is revisiting the topic of AI-driven network management to explore whether the technology has matured and whether IT organizations have found success in using it. This report examines the experiences of individuals who are currently engaged with AI/ML and AIOps solutions aimed at network management. The findings in this report aren't meant to reflect the opinions of enterprise IT organizations in general, but instead, the experiences of only organizations that have actively engaged with AI-driven networking solutions.

Research Methodology

EMA surveyed 250 IT professionals who were either responsible for some aspect of network management or provided executive leadership to a team that was. We also required that these individuals have some experience with the application of AIOps and AI/ML tools to network management. **Figure 1** reveals the results of a qualifying question that probed at their experience with such tools. Large majorities of these respondents researched and evaluated AI/ML and AIOps tools and managed networks with them. Most of them also implemented or installed solutions that apply AI/ML or AIOps to network management. Anyone who selected “none of the above” was disqualified from the survey.

FIGURE 1. WHICH OF THE FOLLOWING DESCRIBES YOUR EXPERIENCE WITH PRODUCTS AND PRODUCT FEATURES THAT APPLY AI, MACHINE LEARNING, AND RELATED TECHNOLOGIES (E.G., AIOPS) TO NETWORK MANAGEMENT?



Sample Size = 313

Figure 2 reveals the demographic details of the research respondents. More than half of respondents were in middle management positions, such as IT managers, supervisors, or directors. We surveyed a variety of silos within the organization, including network operations, cloud operations, network

engineering, cybersecurity, and the IT tool engineering team. The companies represented in the survey ranged from midmarket to very large enterprises from more than one dozen industries.

FIGURE 2. DEMOGRAPHIC OVERVIEW

Top Job Titles

- 33.6%** IT director
- 20.4%** IT manager/supervisor
- 11.6%** CIO/CTO
- 8.4%** Network engineer
- 6.0%** Network/Systems administrator
- 5.2%** IT vice president
- 4.4%** Network architect

IT Groups

- 21.6%** CIO suit
- 20.0%** IT tool engineering team
- 16.2%** Network or IT operations
- 12.0%** Cloud operations
- 10.0%** Network engineering
- 10.0%** IT security/cybersecurity
- 6.0%** IT architecture
- 4.8%** Data center operations

Top Industries

- 25.6%** Manufacturing
- 18%** Banking/Finance/Insurance
- 12.8%** Retail
- 8.8%** Healthcare/Hospitals
- 7.6%** Construction/Civil engineering
- 6.8%** Professional/Business services
- 3.6%** Education
- 3.6%** Energy/Utilities

Company Size (Employees)

- 38.4%** 500 to 2,499
- 31.2%** 2,500 to 4,999
- 18.8%** 5,000 to 9,999
- 11.6%** 10,000 or more

Annual Revenue

- 37.2%** \$50 million to less than \$500 million
- 26.0%** \$500 million to less than \$1 billion
- 34.0%** \$1 billion or more
- 2.8%** No revenue/unknown



Key Findings

Only 36% have been completely successful with managing their networks with AI/ML and AIOps technology

- Nearly 92% of organizations believe AI/ML-driven network management can lead to better business outcomes
 - Only 36% have been completely successful with managing their networks with AI/ML and AIOps technology
 - AI-driven networking initiatives are challenged by security and compliance risk, network team skills gaps, network complexity, data issues, and interoperability and integration issues
 - The top benefits of AI-driven network management are network optimization, network agility, improved security and compliance, and network resiliency
- Most organizations apply AI/ML and AIOps to network management via their network management vendors and network infrastructure vendors. Domain-agnostic AIOps products are less popular for network management use cases
 - 40% of organizations in this research integrated AI/ML technology into nearly all their network management processes
 - Network optimization, automated troubleshooting, intelligent alerting and escalations, and vendor management are top priority use cases for AI/ML
 - 44% of respondents have strong trust in their AI/ML and AIOps solutions to provide accurate insights and recommendations about network management
 - 59% believe that autonomous networking, where network management decisions are made without human intervention with AI/ML and AIOps, is inevitable



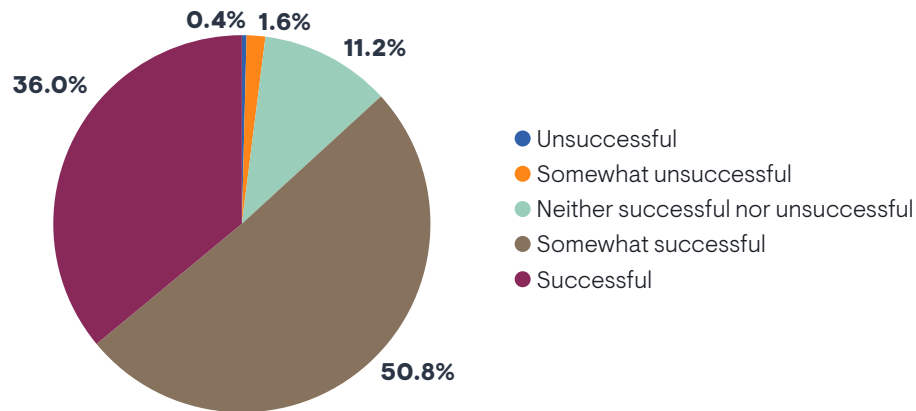
Benefits and Challenges with AI-Driven Networking

Benefits and Success

Most Could be Doing Better

Figure 3 reveals that only 36% of respondents believe their organizations have been completely successful with applying AI/ML and AIOps technology to network management thus far. Nearly 51% rate themselves as somewhat successful, suggesting that they see room for improvement. Only 2% believe they've been failures.

FIGURE 3. HOW WOULD YOU RATE YOUR ORGANIZATION'S OVERALL SUCCESS WITH APPLYING AI/ML AND AIOps TECHNOLOGY TO NETWORK MANAGEMENT THUS FAR?



Sample Size = 250

Notably, this is an improvement over EMA's 2021 research on this topic. Two years ago, only 30% of respondents rated themselves as completely successful with this technology.

An IT vice president at a \$9 billion financial services company said his company is early in its AIOps journey, but he's confident about its approach. "I'm on the right path because we're doing it right by taking our time. You can't just buy something and have it work. Often, people are struggling to understand what [AIOps] means, and it takes time to explain it to them even though these are smart people."

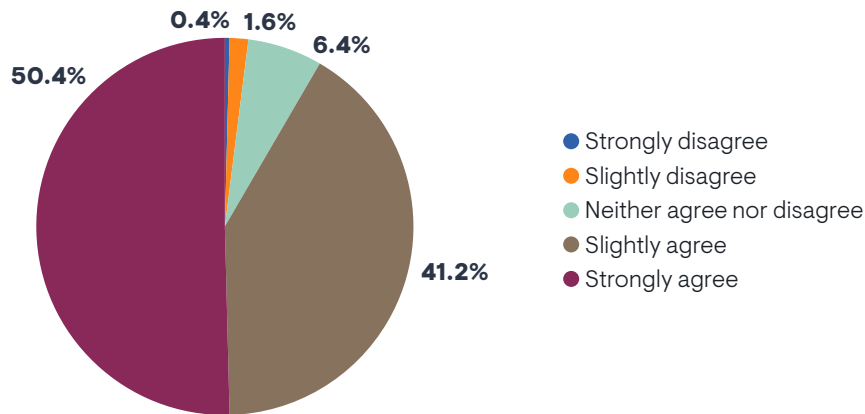
"It's hard to say if we've been successful," said an IT operations manager with a \$15 billion financial services company. "We're still in the crawl-before-we-walk-and-run phase. Right now, I'd give us a four or five out of ten because we're not finished with the deployment yet. I'm hoping for a seven or eight out of ten once we're finished."

There is a significant gap between upper management and technical experts. Exactly half of IT executives believe their efforts have been a complete success, but only 24% of technical personnel feel that way. Middle managers are in between (37%). The network engineering, network operations, architecture, and cloud operations teams are all more pessimistic about AI/ML success. The CIO's suite and the IT tool engineering team are the most sanguine.

Better Business Outcomes with AI/ML

There is broad recognition that applying AI/ML and AIOps to network management will lead to good things. **Figure 4** reveals that nearly 92% of research respondents believe AI-driven network management will likely translate to better business outcomes. Technology adoption strategy has some bearing on positive outlooks. This belief in potential improved business outcomes is especially strong among organizations that are adopting AI/ML and AIOps features offered by their network management or network infrastructure vendors. Organizations that are developing homegrown AIOps tools for network management are less confident.

FIGURE 4. DO YOU AGREE OR DISAGREE WITH THIS STATEMENT? THE APPLICATION OF AI/ML OR AIOPS TECHNOLOGY TO NETWORK MANAGEMENT CAN LEAD TO BETTER BUSINESS OUTCOMES FOR MY OVERALL ENTERPRISE.



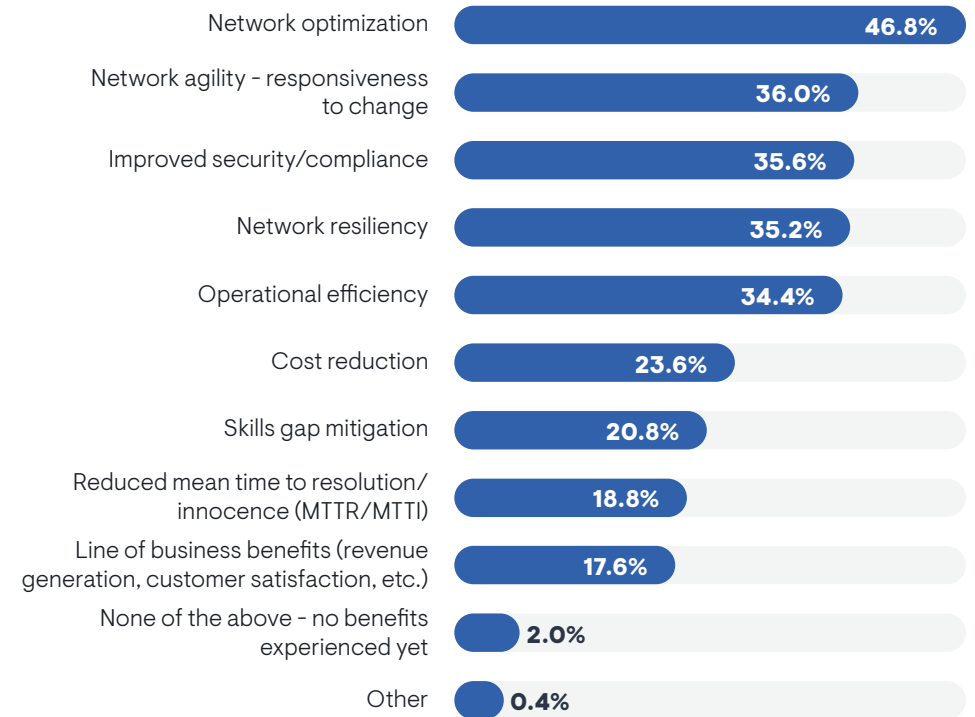
The CIO’s suite, the IT architecture team, and cybersecurity are the most convinced of this opportunity. Network engineering and network operations teams are more skeptical.

Sample Size = 250

Overall Benefits of AI-Driven Network Management

Figure 5 reveals the benefits that IT organizations are experiencing with these tools. Overall, 98% of organizations have experienced at least one benefit from AI-driven network management technology. The biggest opportunity is network optimization. The network simply runs better. The cybersecurity team was more likely to perceive this benefit. The CIO’s suite, the cloud operations team and the network operations team were a little less likely to report it. The network engineering team was the least likely to perceive network optimization as a benefit.

FIGURE 5. TOP BENEFITS OF APPLYING AI/ML AND AIOPS TECHNOLOGY TO NETWORK MANAGEMENT



Sample Size = 250, Valid Cases = 250, Total Mentions = 678

Network agility, improved security and compliance, network resiliency, and operational efficiency were the chief secondary benefits of AI/ML and AIOps. The most successful users of this technology were more likely to report security and compliance benefits. The network engineering team and the network operations team both seized on network resiliency as a big opportunity, but cloud operations and the IT tool engineering team were less likely to perceive it. Instead, the cloud operations team saw network agility as an opportunity.

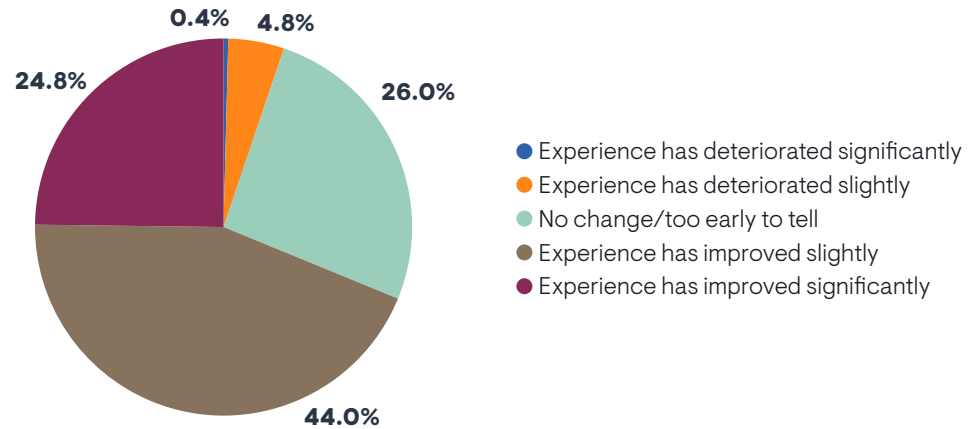
Organizations experienced cost reduction, skills gap mitigation, reduced MTTR/MTTI, and line of business benefits less frequently. However, IT executives were more than twice as likely as technical personnel to report line of business benefits, such as revenue generation and customer satisfaction.

An IT operations manager at a \$15 billion financial services company said reduced MTTR/MTTI is the initial focus for the network operations team, and over time, they will target dynamic thresholding and anomaly detection. “The network team is often pointed at as the source of an issue, so they want to make sure that root cause is correct. They think that by integrating their events into our AIOps platform they’ll be able to pinpoint the root cause quickly. It’s about speeding up problem isolation and preventing war rooms.”

Key Benchmark: User Experience

Figure 6 shows that nearly 69% of organizations have experienced at least some improvement in overall end-user experience since they adopted AI/ML and AIOps technology for network management. This improvement is strongest among users of commercial AI/ML and AIOps solutions. Organizations with homegrown tools were less likely to report such improvements.

FIGURE 6. HAS YOUR ORGANIZATION OBSERVED ANY CHANGE IN OVERALL END-USER EXPERIENCE SINCE ADOPTING AI/ML AND AIOps TECHNOLOGY FOR NETWORK MANAGEMENT?



The CIO’s suite, the cloud operations team, and the IT tool engineering team are perceiving the biggest improvements to end-user experience. Network engineering, network operations, and IT architecture teams are seeing more modest improvements. Overall, IT executives and – to a slightly lesser extent – middle managers are more enthusiastic about these improvements than technical personnel.

Sample Size = 250

Challenges and Barriers to Success

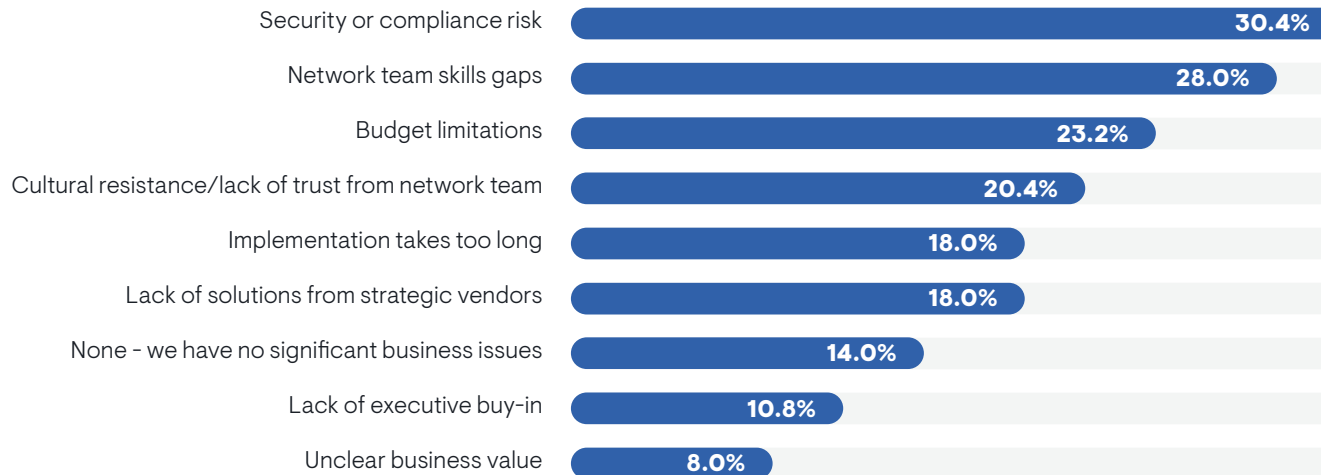
Business Issues That Undermine AI/ML Use

Figure 7 reveals the business issues that are causing organizations pain as they try to apply AI/ML and AIOps to network management. Overall, 86% are experiencing at least one business-related challenge. The biggest issue is security or compliance risk. This relates to tolerance for exposing data for AI/ML analysis, but it also concerns the allowance of AI/ML-driven automation that could open an organization to compliance violations and security exposure. For instance, a director of infrastructure engineering at a \$500 million biotechnology company said his people have been experimenting with ChatGPT, but they’re unable to enter specific business data into the tool when asking it questions due to HIPAA compliance concerns. “We can’t put that data into the [ChatGPT] cloud.”

Many organizations are also struggling with network team skills gaps. They are probably experiencing this pain when evaluating and implementing AI/ML solutions, but skills gaps might also come into play while using the tools because the technology can force engineers to adopt more of a business-level approach to operations given that they’re spending less time digging into data and managing networks manually.

Budget issues and cultural resistance round out the top four issues. Members of the network engineering team singled out cultural resistance as their biggest problem. Forty percent of respondents from that group selected it versus only 17% of people from the CIO’s suite.

FIGURE 7. BUSINESS ISSUES THAT CHALLENGE ORGANIZATIONS WHEN THEY APPLY AI/ML AND AIOps TECHNOLOGY TO NETWORK MANAGEMENT



Sample Size = 250, Valid Cases = 250, Total Mentions = 427

An IT vice president with a \$9 billion financial services company said IT leadership is the key to overcoming cultural resistance. “It has to come from the top or you will fail. I know of an insurance company that didn’t do it from the top down and they’ll never recover. They went out and bought a really expensive AIOps product, but no one wanted to use it. You’ve got to get all those people on board before you even start.”

“There is always a little bit of resistance, but mostly people are excited by [our AIOps] project,” said an IT operations manager at a \$15 billion financial services company. “We haven’t completely finished it yet and haven’t seen all the benefits yet, but people think it’s going to be helpful.”

Technical Issues That Undermine AI/ML Use

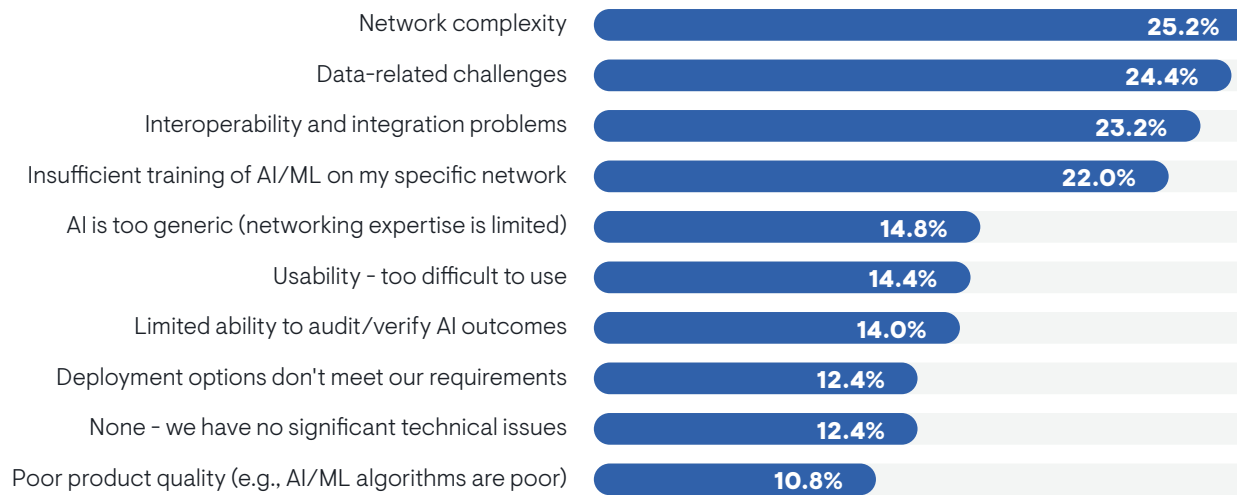
Figure 8 examines the technical challenges that organizations are encountering. There are four major issues, starting with network complexity. This complexity is probably making it hard for AI/ML systems to understand individual networks fully. It also challenges the network team’s ability to validate

AI/ML insights. Network complexity is most challenging for users of AI/ML solutions provided by a network infrastructure vendor, which suggests that some of this complexity issue is related to multi-vendor networking. A network infrastructure vendor’s AI/ML technology is going to have limited support of third-party hardware and software.

Data-related problems (access, quality) is the second leading challenge. “AIOps needs data to drive its workflows,” said an IT vice president with a \$9 billion financial services company. “If you don’t have data, you don’t have AIOps. The first thing you need to do [for AIOps] is get your data ready. Look at it, understand it, and see where the gaps are.”

Interoperability/integration issues and poor system training on a specific network are the other two major challenges. Interoperability/Integration and training are both more challenging for domain-agnostic AIOps solutions than network-specific solutions. Interoperability is also a more common problem for larger companies.

FIGURE 8. TECHNICAL ISSUES THAT CHALLENGE ORGANIZATIONS WHEN THEY APPLY AI/ML AND AIOPS TECHNOLOGY TO NETWORK MANAGEMENT



Sample Size = 250, Valid Cases = 250, Total Mentions = 434



AI-Driven Networking Technology Strategy

Overall Strategy Across IT

Strategic Priority of AI-Driven IT Management

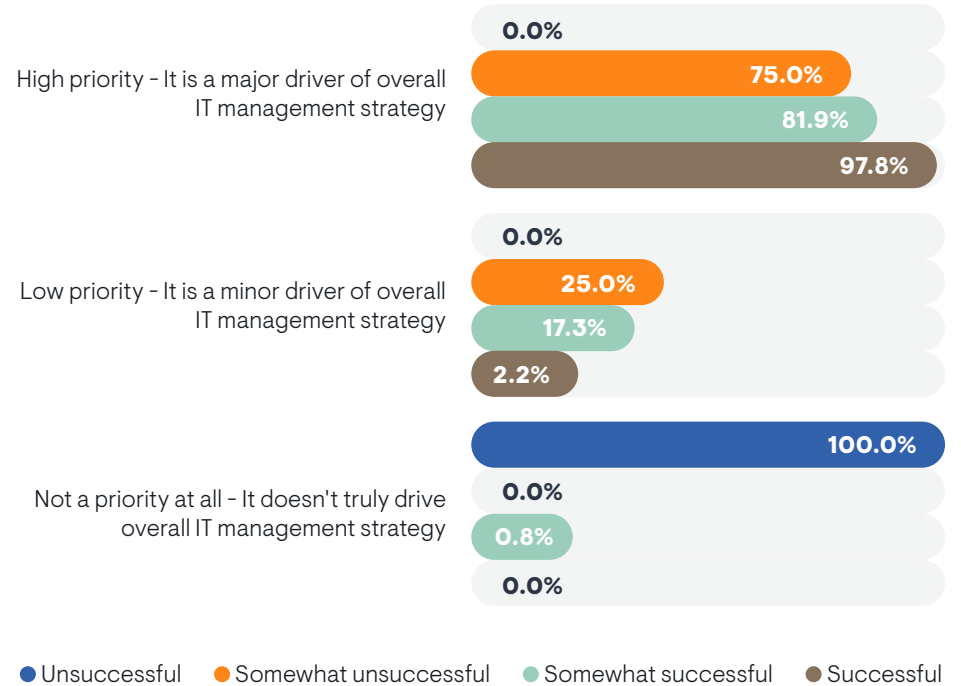
EMA asked respondents to generally characterize their organizations' overall disposition toward applying AI/ML and AIOps technology to IT management. Eighty-four percent revealed that it was a high priority and a major driver of overall IT management strategy. Nearly 15% said it was only a minor driver and 1% said it was not a priority at all. Bear in mind that this research is based on a survey of IT professionals currently engaged with AI-driven network management solutions, so this selective sample biases respondents in favor of AI-driven IT management strategy. If AI wasn't a priority, chances are that they wouldn't be engaged with it.

Organizations are more successful with AI-driven network management when AI/ML and AIOps technology is a major driver of IT strategy.

Despite the bias of this survey, this data on prioritization is instructive. **Figure 9** reveals that organizations are more successful with AI-driven network management when AI/ML and AIOps technology is a major driver of IT strategy. In other words, IT organizations that dabble in AI are less likely to get value from applying it to networks.

EMA also found that much of the energy behind this strategic drive toward AI-driven IT management is coming from IT executives and middle management. They tended to identify it as a major driver. Subject matter experts like admins, engineers, and architects tended to tell EMA that AI was only a low priority.

FIGURE 9. STRATEGIC PRIORITY OF APPLYING AI/ML AND AIOPS TECHNOLOGIES TO IT MANAGEMENT IN GENERAL, BY OVERALL SUCCESS WITH APPLYING THE TECHNOLOGY SPECIFICALLY TO NETWORK MANAGEMENT



Sample Size = 250

Network-Specific AI/ML Technology More Popular Than Domain-Agnostic AIOps

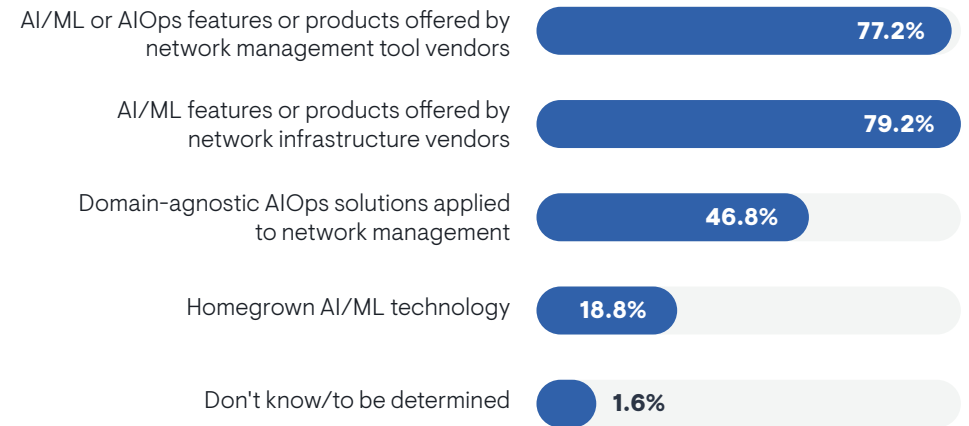
Domain-agnostic AIOps products are popular, particularly IT service management platforms that use AI/ML to automate event correlation and ticket management. However, network infrastructure and network management vendors are investing in AI/ML technology to address network management use cases in particular. In other words, network teams have multiple options for applying AI to network operations. **Figure 10** reveals that many organizations will take a multi-vendor approach to AI-driven network management, with a strong preference for solutions that are specifically designed to address network management use cases.

More than 79% are using or plan to use AI/ML or AIOps capabilities offered by their network infrastructure vendors and more than 77% use or plan to use capabilities from their network management vendors. Meanwhile, nearly 47% are using or planning to use domain-agnostic AIOps solutions, and nearly 19% are developing homegrown AI tools to apply to networking.

An IT operations manager at a \$15 billion financial services company said his company is focusing on a centralized, domain-agnostic AIOps solution. He has no plans to adopt AIOps and AI/ML capabilities from network management or network infrastructure vendors. “If [our network management vendor] offers something free that’s included, we will use it, but if it’s an additional license, we won’t adopt it. Our IT architecture team is pushing a central approach.”

Members of cloud operations teams and CIO’s suites were more likely to perceive adoption of AI capabilities from network management tool vendors. Members of IT tool engineering teams were more likely to perceive use of domain-agnostic AIOps.

FIGURE 10. WHICH OF THE FOLLOWING DESCRIBES HOW AI/ML AND AIOps TECHNOLOGY ARE APPLIED OR WILL BE APPLIED TO NETWORK MANAGEMENT IN YOUR ORGANIZATION?



Sample Size = 250, Valid Cases = 250, Total Mentions = 559

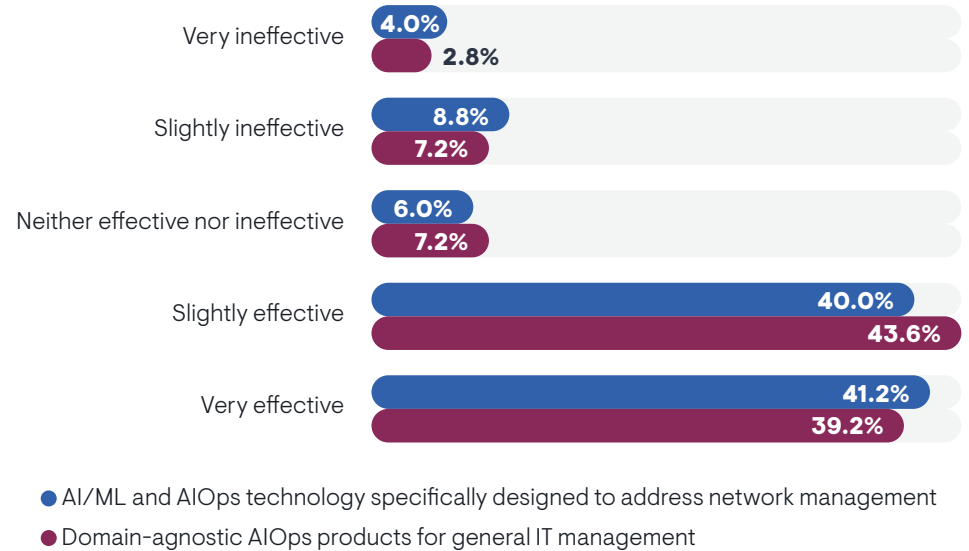
Evaluating AI/ML Technology

Effectiveness of Evaluation

The relative novelty of AI/ML and AIOps technology challenges an IT organization’s ability to evaluate products. Decision-makers must cut through the hype and ensure that the technology they implement actually works. Many network teams lack experience with AI, posing a potential challenge.

Figure 11 reveals that around 40% of organizations believe they are fully effective at evaluating this technology, which is in line with EMA’s finding in 2021 when 41% of respondents reported effective evaluation of AI solutions. Many organizations rated themselves as slightly effective, suggesting that they need to improve in this area. Overall, these respondents are slightly more confident in their ability to evaluate AI technology specifically designed to apply to network management and a little less confident in their ability to evaluate domain-agnostic AIOps solutions.

FIGURE 11. ORGANIZATIONAL EFFECTIVENESS WITH EVALUATING AI/ML TECHNOLOGY APPLIED TO NETWORK MANAGEMENT



Sample Size = 250

Much of the confidence in this chart is coming from IT executives. For instance, 64% of executives believe their organizations are very effective at evaluating AI/ML solutions specifically designed to address network management, but only 27% of technical personnel (engineering and architects) feel the same way.

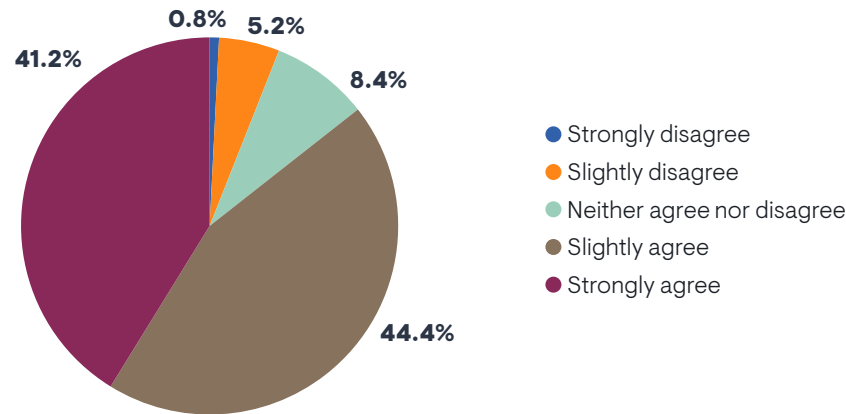
The technology evaluation confidence gap between subject matter experts and IT executives is highly concerning, especially since this research found that effective evaluation of technology correlates very strongly with overall success. Seventy-two percent of successful users of AI-driven network management described themselves as very effective with evaluating solutions specifically designed for network management, but only 28% of somewhat successful, 26% of somewhat unsuccessful, and 0% of unsuccessful organizations felt that way.

Knowledge of AI/ML Algorithms

IT organizations will need to develop some knowledge of AI/ML algorithms to improve their ability to evaluate these solutions. **Figure 12** reveals that nearly 86% of respondents at least somewhat agree that this knowledge is required. Successful users of the technology are the most likely to feel strongly about this. Larger companies believe they need this more than smaller companies, probably because they have the resources to hire and develop such expertise.

IT organizations need to develop some knowledge of AI/ML algorithms to improve their ability to evaluate these solutions.

FIGURE 12. DO YOU AGREE OR DISAGREE THAT ONE MUST HAVE IN-DEPTH KNOWLEDGE OF AI AND ML ALGORITHMS TO EVALUATE THE AI/ML AND AIOPS TECHNOLOGY THAT IS APPLIED TO NETWORK MANAGEMENT?



Sample Size = 250

Evaluation Techniques

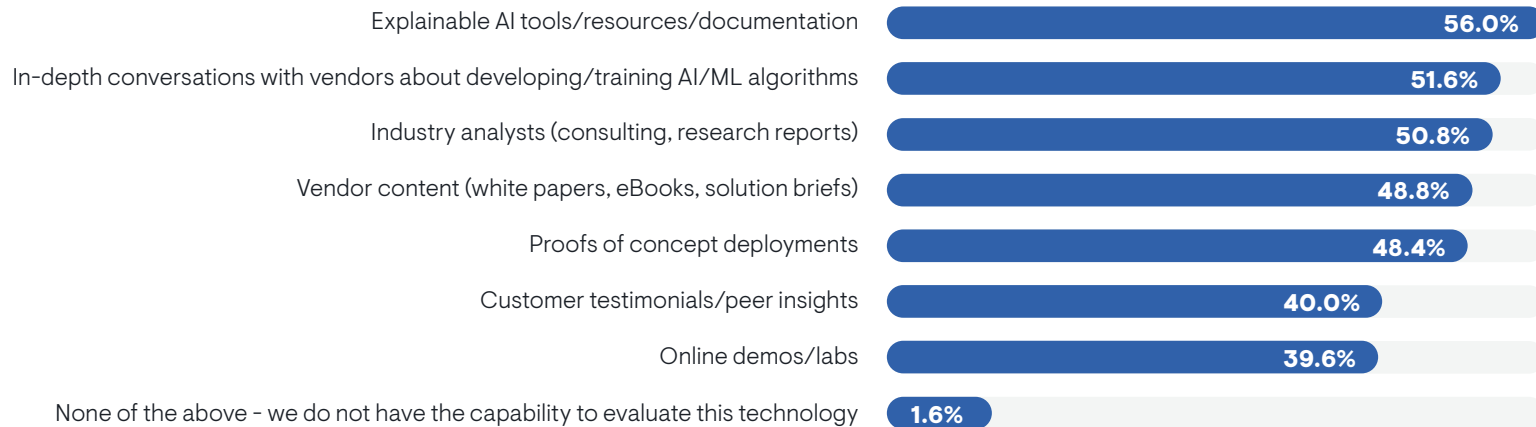
Figure 13 identifies how organizations are evaluating AI/ML for network management. Explainable AI tops the list. Explainable AI is an academic concept that stresses the importance of having tools that elucidate the decision-making and prediction processes of AI systems. It helps users understand how AI systems work and builds trust in those systems. Members of IT tool engineering and cloud operations teams and the CIO’s suite were more likely to stress the importance of explainable AI. The network operations team was less likely.

A majority also indicated that they rely on in-depth conversations with vendors about AI algorithm development and training. This aligns with our earlier finding that most organizations believe that a strong understanding of AI algorithms is important to AI/ML and AIOps product evaluation. Decision-makers need to know enough about these algorithms to allow them to ask potential vendors probing questions about their solutions.

Secondarily, many organizations rely on industry analysts, vendor content (white papers, solution briefs), and proof-of-concept deployment to complete a technology evaluation.

Organizations were less likely to look to customer testimonials and peer insights; however, the most successful users of AI-driven network management were much more likely to rely on these insights. Organizations that use domain-agnostic AIOps solutions rather than solutions offered by network management and infrastructure vendors were more likely to leverage peer insights.

FIGURE 13. WHEN EVALUATING PRODUCTS FOR POTENTIAL ADOPTION, HOW DOES YOUR ORGANIZATION DETERMINE THE EFFICACY OF THE AI/ML OR AIOps TECHNOLOGY?



Sample Size = 250, Valid Cases = 250, Total Mentions = 842

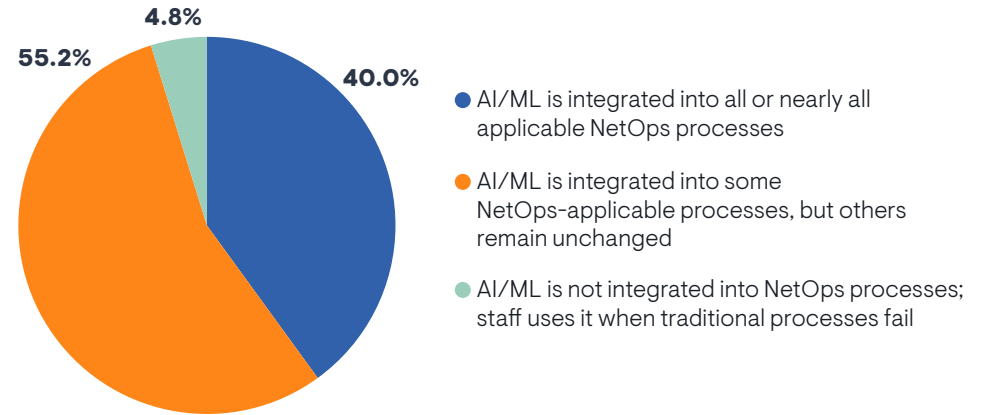
Transforming Network Operations

40% of respondents say their network teams have integrated AI/ML into all or nearly all of their operational processes.

Figure 14 reveals how much AI/ML and AIOps solutions have permeated network infrastructure and operations processes. Overall, 40% of respondents say their network teams have integrated AI/ML into all or nearly all of their operational processes. The majority say this technology is only partially integrated, while a small sliver of organizations only turn to AI/ML when traditional processes fail. This data suggests that once AI/ML and AIOps are adopted for network management, many organizations completely transform network operations. Successful users of this technology are much more likely (71%) to report that AI/ML is integrated into all their processes.

Perspectives on how much AI/ML has permeated network operations vary by silo. The IT tool engineering team reports the most extensive transformation. The CIO’s suite reports the second-highest rate of transformation. Cloud operations and cybersecurity both report moderate levels of transformation. Network engineering, network operations, and IT architecture all report the lowest levels of transformation.

FIGURE 14. TO WHAT EXTENT HAS AI/ML OR AIOps TECHNOLOGY CHANGED THE WAY YOUR NETWORK OPERATIONS PERSONNEL WORK?



Sample Size = 250

Essential Use Cases

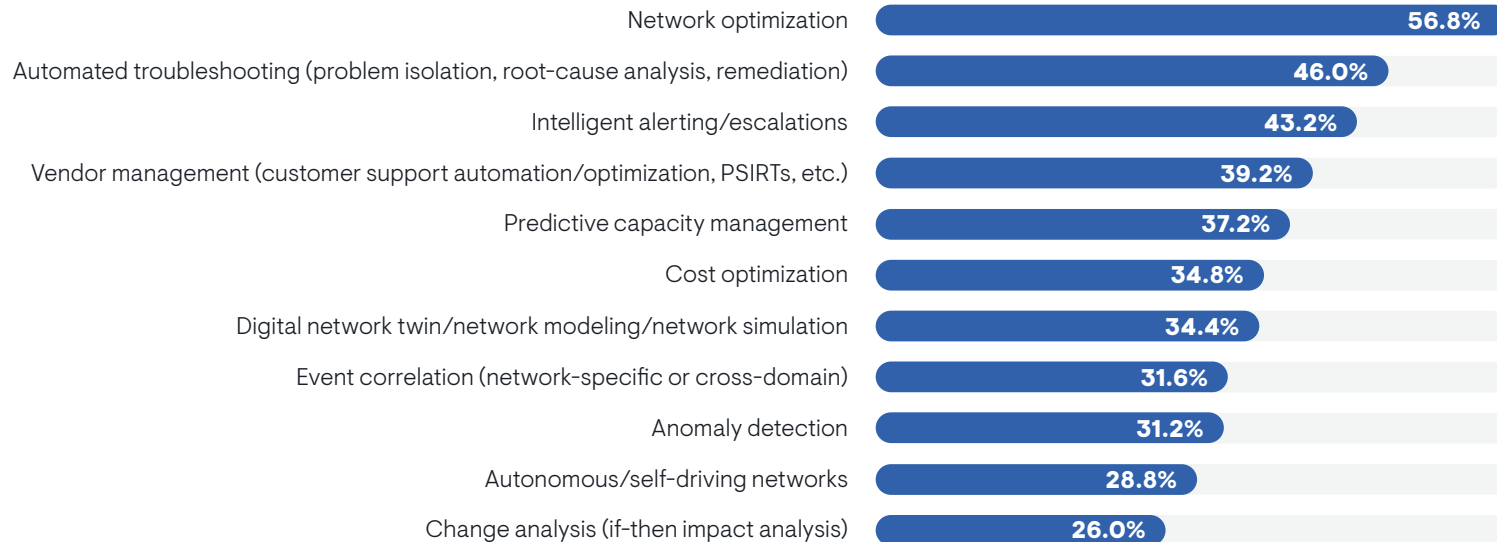
Figure 15 reveals the network management use cases for which AI/ML and AIOps technology can be most valuable. The top priority is clearly network optimization. Organizations believe AI can identify ways in which they can tune the network to best serve the business.

The top secondary use cases are automated troubleshooting, intelligent alerting and escalations, vendor management (e.g., automation of customer support interactions and software patching), and predictive capacity management. Intelligent alerting and automated troubleshooting were more popular use cases for larger companies. Larger companies were also more likely to select the two use cases at the bottom of the list: autonomous networking and change analysis.

An IT vice president with a \$9 billion financial services company noted that change analysis and digital twins are critical AIOps use cases. “It’s essential to be able to predict problems before you implement a change and predict a change before it comes a problem.”

The most successful users of AI technology were more likely to target two of the most popular use cases: network optimization and vendor management. Successful organizations also had a greater affinity for less popular use cases, such as anomaly detection and digital network twins. The digital twin use case was also more popular among people who have actually used AI to manage networks versus those who implement such solutions, suggesting that the value of a digital network twin becomes more apparent as people gain experience with it.

FIGURE 15. MOST VALUABLE NETWORK MANAGEMENT USE CASES FOR AI/ML AND AIOPS TECHNOLOGY



Sample Size = 250, Valid Cases = 250, Total Mentions = 1,023

Use Cases That Vendors Need to Improve

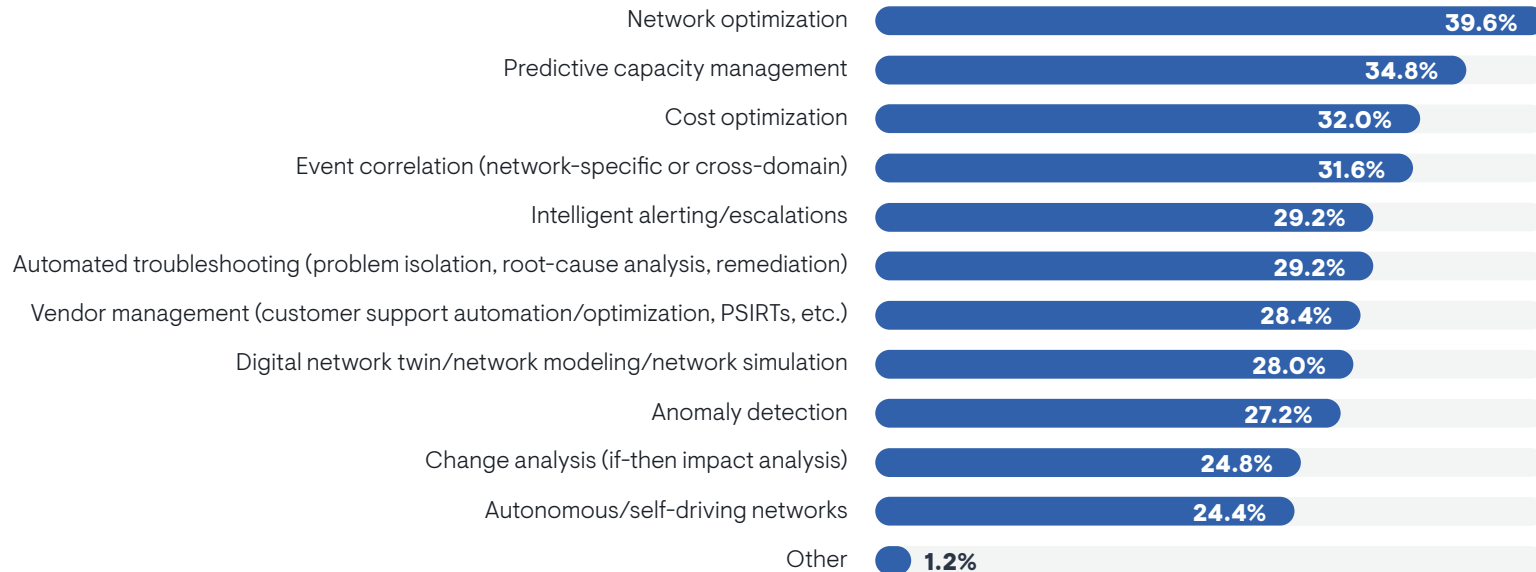
Figure 16 reveals which use cases need better support from the AI/ML and AIOps solutions that vendors are developing. Although the previous chart showed that network optimization is the most valuable use case, it's also the most poorly supported use case. Vendors need to find a way to improve how AI delivers on network optimization. Members of network operations teams especially believe network optimization needs improvement.

Predictive capacity management is the second-biggest opportunity for improved support by vendors. IT executives and middle managers were especially integrated in getting support of this use case.

Cost optimization and event correlation round out the top four use cases in need of improved support. Event correlation is a bigger issue for organizations that use domain-agnostic AIOps solutions. Organizations that use AI/ML or AIOps features offered by their network infrastructure vendors were less likely to complain about event correlation support.

Anomaly detection, change analysis, and autonomous networking generated the fewest complaints. The former two use cases are some of the earliest use cases tackled by AIOps solution providers, so it makes sense that they would be more mature. Autonomous networking is clearly a still-emerging use case, so one would think respondents would call it out for improvement. On the other hand, the lack of complaints may be due to the lack of strong demand.

FIGURE 16. NETWORK MANAGEMENT USE CASES FOR AI/ML AND AIOPS TECHNOLOGY THAT VENDORS MOST STRUGGLE TO SUPPORT



Sample Size = 250, Valid Cases = 250, Total Mentions = 826

AI Assistants for Network Management

OpenAI’s ChatGPT demonstrated the potential power and utility of chatbots. ChatGPT’s large language model uses supervised and reinforcement learning to generate content on an unlimited number of topics. For instance, ChatGPT can generate network-specific switch configurations or network automation scripts within seconds.

Now, imagine a chatbot that is knowledgeable about a specific company’s network, able to provide intelligent answers, and execute changes based on typed requests from a network admin. Such a chatbot can provide valuable answers to questions such as, “Do I have any bad Wi-Fi connections?” or “Has there been any configuration drift on my WAN?” It could also execute changes, such as “Block all traffic coming from this IP address.”

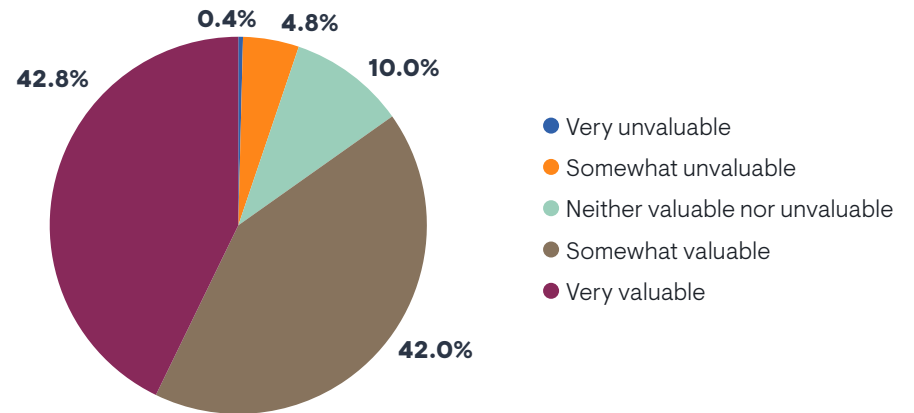
Figure 17 reveals that there is significant interest in a network assistant capability from IT organizations. Nearly 85% believe it is at least somewhat valuable. The most successful users of AI-driven network management solutions rated network chatbots as more important. IT executives and middle managers are more likely to embrace chatbots than technical personnel. Interest is also stronger from larger enterprises.

The most successful users of AI-driven network management solutions rated network chatbots as more important.

The director of infrastructure engineering at a \$500 million biotechnology company told EMA that chatbots like ChatGPT are going to disrupt IT in general. “I’m one of the best network engineers in the world, and anything I can do, ChatGPT can do faster. I gave it a paragraph of instructions for a premium routing config

that would have taken me a couple hours to write. It had it all done in about a minute. Then, I asked it to draw a network diagram and it did that in minutes. I asked it to convert everything into Puppet, so now we had it all in config management. That’s a day’s worth of work that it was able to do in 10 minutes. The next step is integrating these large language models into IT management tools. Everything is going to just have this as a default capability.”

FIGURE 17. TO WHAT EXTENT DO YOU THINK IT IS VALUABLE TO HAVE A CONVERSATIONAL CHATBOT OR VIRTUAL ASSISTANT THAT CAN RETRIEVE INFORMATION AND ANSWER QUESTIONS BASED ON NATURAL LANGUAGE PROCESSING?



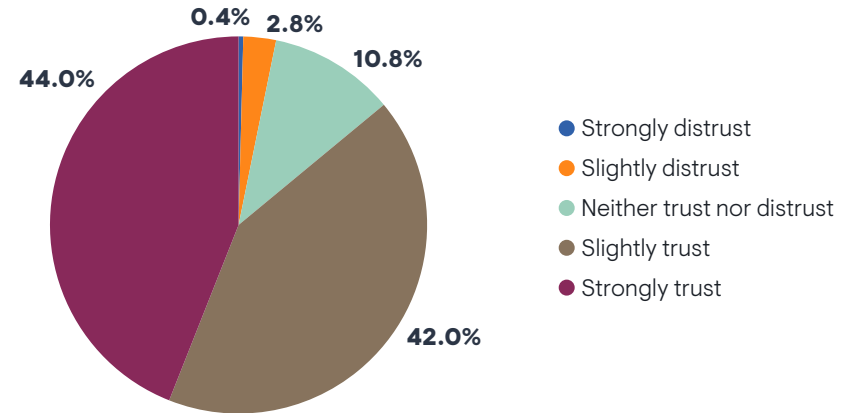
Sample Size = 250

Trust in AIOps

Trust is essential in IT management tools. Without it, adoption will lag and organizations will not get full value out of their investments. **Figure 18** reveals that 86% of research participants trust the ability of AI/ML and AIOps technology to provide accurate insights and recommendations for network management. However, only half of those people describe that trust as strong. Many see room for improvement and clearly want this technology to prove itself further.

Trust in AI insights and recommendations is highest among respondents who believe their organizations have been the most successful with this technology. It's also higher among people who use this technology as opposed to those who have researched and evaluated it. Members of the network engineering team are more likely to have some skepticism, while the CIO's suite, cloud operations, cybersecurity, and the IT tool engineering team are all more likely to trust the technology.

FIGURE 18. TO WHAT EXTENT DO YOU TRUST AI/ML AND AIOps TECHNOLOGY TODAY TO PROVIDE ACCURATE INSIGHTS AND RECOMMENDATIONS FOR NETWORK MANAGEMENT?

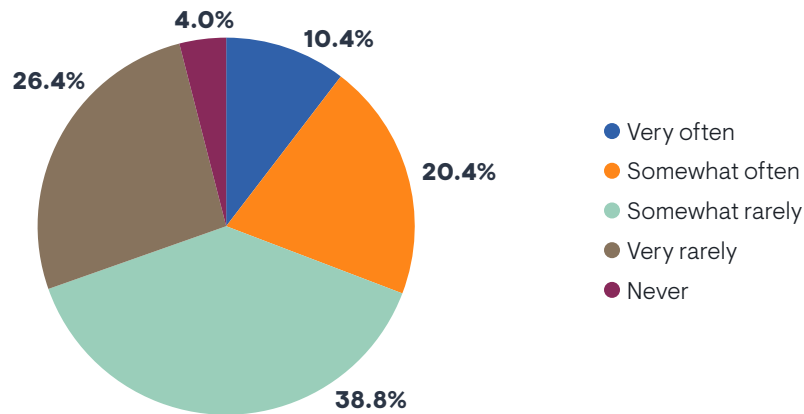


Sample Size = 250

AI Mistakes

A key component of trust is accuracy. **Figure 19** reveals that 96% of respondents have seen AI/ML and AIOps technology provide false or mistaken insights and recommendations about network management. However, the majority of respondents describe such incidents as rare. Only 10% have seen false AI/ML tools generate false insights very often.

FIGURE 19. HOW OFTEN DOES AI/ML AND AIOps TECHNOLOGY APPLIED TO NETWORK MANAGEMENT PROVIDE FALSE OR MISTAKEN INSIGHTS AND RECOMMENDATIONS?



EMA found that the most successful users of AI-driven network management were the least likely to see frequent mistakes from AI tools. Organizations that are using homegrown AI/ML technology for network management were the most likely to see frequent false insights from their tools, while users of commercial solutions saw fewer mistakes. Users of AI/ML and AIOps features offered by network management and network infrastructure vendors were the least likely to see mistakes.

IT executives reported higher rates of AI mistakes than middle managers, and larger companies struggled more often with this issue than smaller companies.

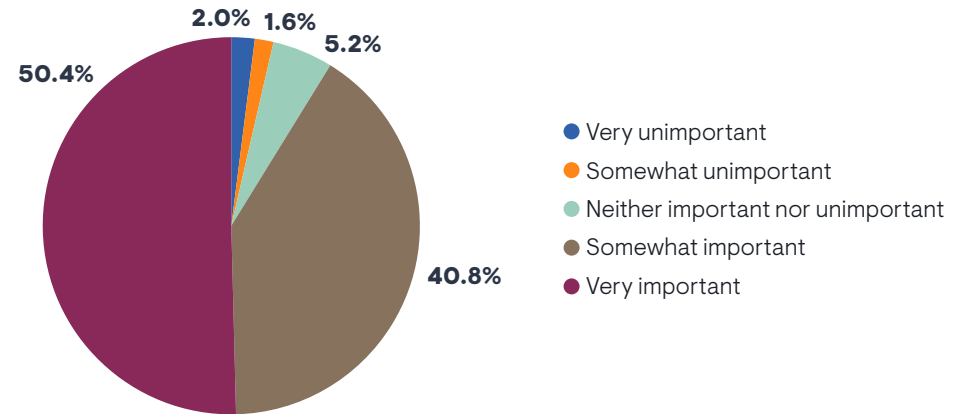
Sample Size = 250

Explainable AI

One way to build trust in AI-driven network management is to implement solutions that work, but sometimes that isn't enough. IT personnel will remain skeptical of black box solutions that offer no insight into how they derived knowledge from the network. That's where explainable AI comes into play. Earlier, we noted that explainable AI capabilities are essential to evaluating AI/ML solutions, but they can also build trust once a solution is in production.

Figure 20 reveals that more than 91% of respondents believe it is at least somewhat important to have explainable AI features in the AIOps solutions that they apply to network management. More than half believe this is very important. Nearly 86% of the most successful users of AI-driven networking said explainable AI is very important.

FIGURE 20. IS IT IMPORTANT FOR YOU TO HAVE EXPLAINABLE AI CAPABILITIES IN THE AI/ML AND AIOps TECHNOLOGIES THAT YOU APPLY TO NETWORK MANAGEMENT?

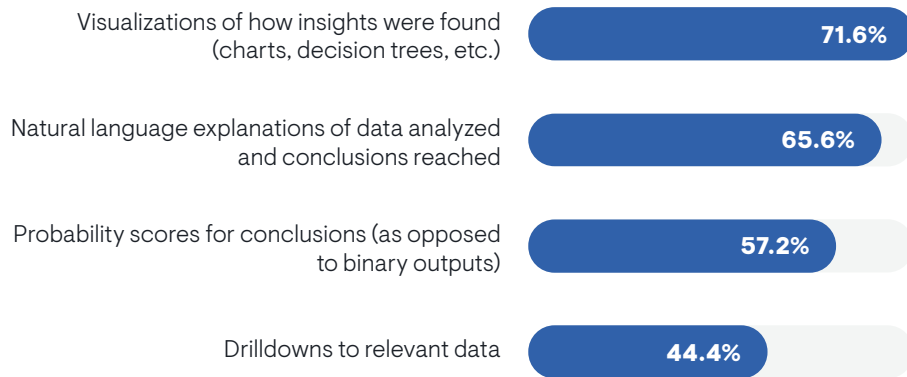


Sample Size = 250

Most of the enthusiasm for explainable AI comes from the CIO’s suite, the IT tool engineering team, and cybersecurity. The network engineering team was less convinced of its value. Also, IT executives and middle managers were more convinced of explainable AI’s importance than technical personnel.

Figure 21 offers some detail about how explainable AI can build trust. Nearly 72% of respondents want visualizations of how AI makes its decisions, with charts and decision trees that graphically reveal how network data was turned into insights and predictions. Much of the enthusiasm for this capability comes from the IT tool engineering team. Network engineering, network operations, and data center operations were less likely to consider it useful.

FIGURE 21. EXPLAINABILITY CAPABILITIES THAT BEST HELP TO BUILD TRUST IN AI/ML AND AIOPS TECHNOLOGIES APPLIED NETWORK MANAGEMENT



Sample Size = 250, Valid Cases = 250, Total Mentions = 597

Most respondents also want AI/ML tools to provide natural language explanations of their work, something that an admin or engineer could read and understand quickly. This capability is more popular with the CIO’s suite, the IT tool engineering team, and cybersecurity. Network engineering and cloud operations teams are less likely to have interest.

Probability scores also appeal to a majority of respondents. Cloud operations professionals were more likely to value probability scores than network engineering team members.

Drilldowns to relevant data are the least valuable explainable AI capability, which makes sense. They will have the least amount of utility given that only a subset of users will have the skills required to analyze that data. Admins who can’t analyze complex data will not learn to trust AI more by having access to data they can’t use. Larger companies, which tend to have more engineering talent, were more interested in this feature.

The most successful users of AI-driven network management were more likely to select visualizations of how insights were acquired, natural language features, and probability scores.

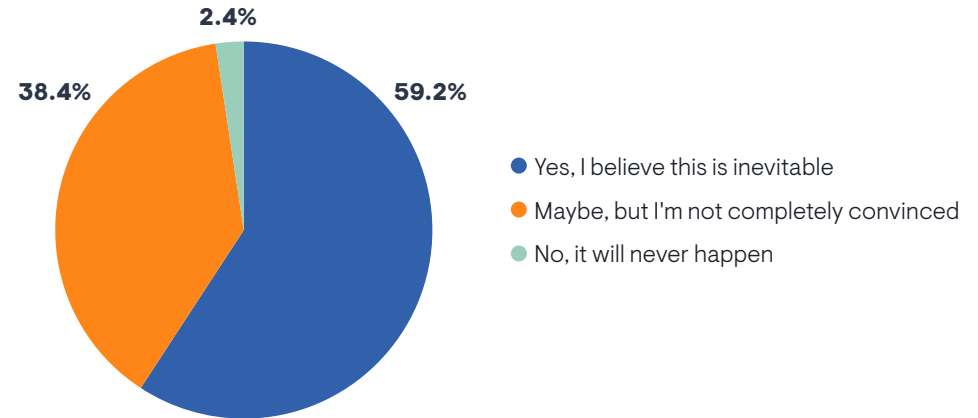
The Future: Autonomous Networks

Earlier, most respondents revealed that their trust in today's AI/ML and AIOps solution to perform automated, closed-loop network troubleshooting is low. **Figure 22** reveals how respondents feel about the future. More than 59% believe that autonomous networks are inevitable with AI/ML technology not just for troubleshooting, but for all aspects of network management. Most others believe it's possible, but they're not yet convinced. Users of domain-agnostic AIOps tools are more likely to think autonomous networks are inevitable. Users of homegrown AI/ML technology are less convinced.

"We want zero ops," said an IT vice president at a \$9 billion financial services company. "We want to never have to fix a problem and know about a problem before it occurs without human intervention. We want zero touch across all domains, [not just the network]. My theory is that's where our industry is headed, or we'll be out of business."

Successful use of AI-driven network management solutions breed a sense of inevitability, while less successful people are less convinced. From a silo perspective, most of the believers work in an IT tool engineering team, the IT architecture group, and the CIO's suite. Cloud operations, network engineering, and cybersecurity are a little less convinced, and the network operations team is more dubious.

FIGURE 22. ARE YOU OPEN TO THE IDEA OF SOMEDAY LETTING YOUR OWN NETWORK RUN AUTONOMOUSLY WITH AI/ML AND AIOps TECHNOLOGY?



Sample Size = 250

Roadblocks to Autonomous Networks

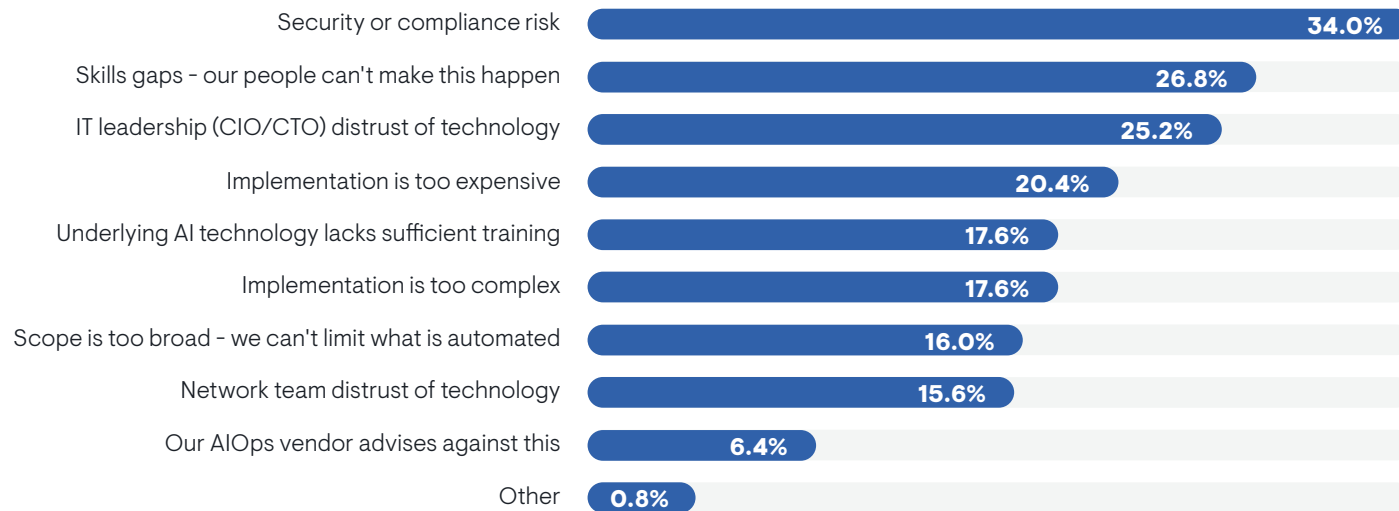
Figure 23 reveals what is holding people back from autonomous networking. As usual, worries about security and compliance risk are prominent. The network engineering team and cybersecurity team are both much more worried about this than other groups.

Skills gaps and IT leaders' distrust of the technology are the other big roadblocks. The CIO's suite is less likely to perceive a skills gap issue, but the IT architecture group singled it out as a top problem. On the other hand, the

CIO's suite is much more likely to cite its own distrust of the technology, while network engineering, network operations, cybersecurity, and the IT tool engineering team all see it as a nonissue.

Expensive implementation is a tertiary issue, but users of homegrown AI/ML see it as a top problem, suggesting that building, maintaining, and operating homegrown solutions are simply too costly. Gaps in training AI systems is another minor issue, but more successful users of AI/ML solutions are more likely to select it.

FIGURE 23. ISSUES MOST LIKELY TO PREVENT AI/ML AND AIOPS TECHNOLOGY FROM FULLY AUTOMATING NETWORKS



Sample Size = 250, Valid Cases = 250, Total Mentions = 451



Conclusion

The good news is that the number of organizations that are finding unmitigated success with AI/ML-driven network management has increased over two years from 30% to 36%. At the same time, confidence remains high, with 92% of respondents believing that using this technology will lead to better business outcomes.

In general, IT organizations are struggling with network management. Over the last six years, EMA research saw a steady decline in the number of network infrastructure operations teams that are successfully supporting their businesses. EMA attributes this decline to a shortage of skilled network engineers, fragmented and sprawling network management toolsets, increased network complexity, and a lack of effective network automation. EMA believes that AI/ML and AIOps technology can reduce the pain felt by these challenges, if not outright improve operations.

Still, the path will be difficult. IT organizations are figuring out how to evaluate and implement these AI/ML and AIOps solutions, and trust in using such technology is largely lukewarm.

IT executives and the engineers and admins who are in the trenches need to get on the same page. EMA believes that executives are overconfident and too trusting in this technology, while technical personnel are too cynical and pessimistic about it. The two groups need to find a middle ground and do the work to make sure these solutions deliver value because, frankly, they need the help that intelligent AI systems can offer.

This research offers a roadmap for how early adopters are finding success. It's clear that network management vendors and network infrastructure vendors can offer value that domain-agnostic AIOps solutions can't. Networking has always been something of a unicorn, and cross-domain systems simply don't have the expertise to address all use cases. It's time for IT organizations to have serious conversations with their networking vendors about how they're leveraging AI and ML technology to transform network operations.

Executives are overconfident and too trusting in this technology, while technical personnel are too cynical and pessimistic.





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