Independent market research and competitive analysis of next-generation business and technology solutions for service providers and vendors

HEAVY READING WHITE PAPER

Artificial Intelligence: Charting the Way Forward for AI

2022 Survey of IT Leaders and Service Providers on AI Deployment

A Heavy Reading white paper produced for CoreSite and Ericsson

CORESITE An American Tower Company

ERICSSON

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INTRODUCTION AND KEY FINDINGS

This report presents the results of the Heavy Reading **AI Acceleration in Data Center Service Provider Survey** conducted during May and June 2022. The survey focused on investigating the opportunities and challenges for artificial intelligence (AI) adoption in data centers and operator networks and helping industry leaders and their customers evaluate the different approaches.

Key findings

- **The survey highlighted key business justifications for service providers deploying AI, including better customer experience and retention, improved network performance, and opportunities for new revenues and cost savings.** The three top benefits for service providers of using AI selected by respondents were improving customer experience and limiting churn (40%), improving network and/or IT performance (39%), and driving innovation and revenue for new business (37%). The results also highlighted savings in both operational expenses (opex) and capital expenses (capex) for network and IT planning.
- **AI usage is expected to accelerate rapidly, and this view is supported by the results of the survey.** These results indicate that the overwhelming majority of companies covered are increasing their use of AI/machine learning (ML). Over the next five years, 82% expect their use of AI to increase, 17% expect the use of AI/ML to remain flat, and none expect the use of AI/ML to decrease.
- **AI/ML will have a significant impact on key technology deployments, including cloud services, smart cities, edge computing, and 5G mobile networks.** 51% of respondents expect AI to have a significant impact on cloud services, 49% selected smart cities, 49% selected edge computing, and 46% selected 5G deployments. Respondents also expect AI to have a significant impact on security (selected by 44%) and Internet of Things (IoT; 40%).
- **The most promising AI technologies selected by respondents include pattern and anomaly detection, prediction and root-cause analysis, AI-bots, intent-based management, and closed-loop automation technologies.** Pattern and anomaly detection was selected by 46%, followed by prediction and root-cause analysis, selected by 33%. AI-bots were selected by 27% of respondents, and two upcoming AI technologies—intent-based management and closed-loop automation technologies—were each selected by approximately 20% of respondents.
- **AI is being deployed in many areas, including IT and cloud operations, network operations, network planning, customer care and experience, and network engineering.** More than 70% said their organization has already deployed AI or will be deploying AI within one year in each of the following areas: IT and cloud operations, network operations, and network planning. More than 60% said their organization has already deployed AI or will be deploying AI within one year in the following areas: customer care, customer experience, and network engineering.
- **64% of service providers have yet to develop a single companywide strategy for AI, suggesting that service providers will need assistance with their AI strategies.** 45% have different AI strategies for different parts of the organization, and 36% have a single companywide strategy.

- **Key challenges in implementing AI are high costs for development and deployment, budget constraints, and internal collaboration.** There were some significant differences in the results between the largest organizations (>$5bn) and smaller organizations. 37% of respondents from smaller organizations (<=$5bn) saw budget constraints as a serious challenge in implementing AI versus 19% from larger organizations. 44% from the largest organizations saw internal collaboration as a serious challenge versus 25% from smaller organizations.
- **Most respondents believe their organization does not have self-sufficient in-house capability for several key competencies and solutions and is likely to need external support.** Just 21% see their organization as having self-sufficient in-house competence and solutions for AI platform operations and platform development. Fewer respondents believe their organization has self-sufficient in-house competence and solutions for the five other competencies and solutions.
- **Low latency networks/interconnection/cloud networking are critically important to businesses' AI infrastructure architecture.** 81% of respondents said low latency networks/interconnection/cloud networking is either critical (23%) or very important (58%) as part of their AI/ML infrastructure architecture. Just 1% see low latency as not important.
- **AI as a service (AIaaS) is likely to be leveraged by many service providers, allowing them to access AI/ML resources without investing in dedicated hardware and software.** 92% of respondents are willing to leverage AIaaS. 45% of respondents said that their organization is willing to leverage hybrid deployment and consumption using both on-premises and AIaaS models, and 38% are willing to leverage AIaaS as support for AI platform and use case development.
- **The majority of businesses are planning to deploy AI in a hybrid combination of on- and off-premises data centers.** The results suggest a shift from on-premises to off-premises locations, particularly for mobile network operators. 44% said that their AI workloads today reside in a hybrid combination of on- and off-premises data centers, rising to 54% in the next five years. Off-premises colocation data centers and edge data centers show significant increases in the next five years.

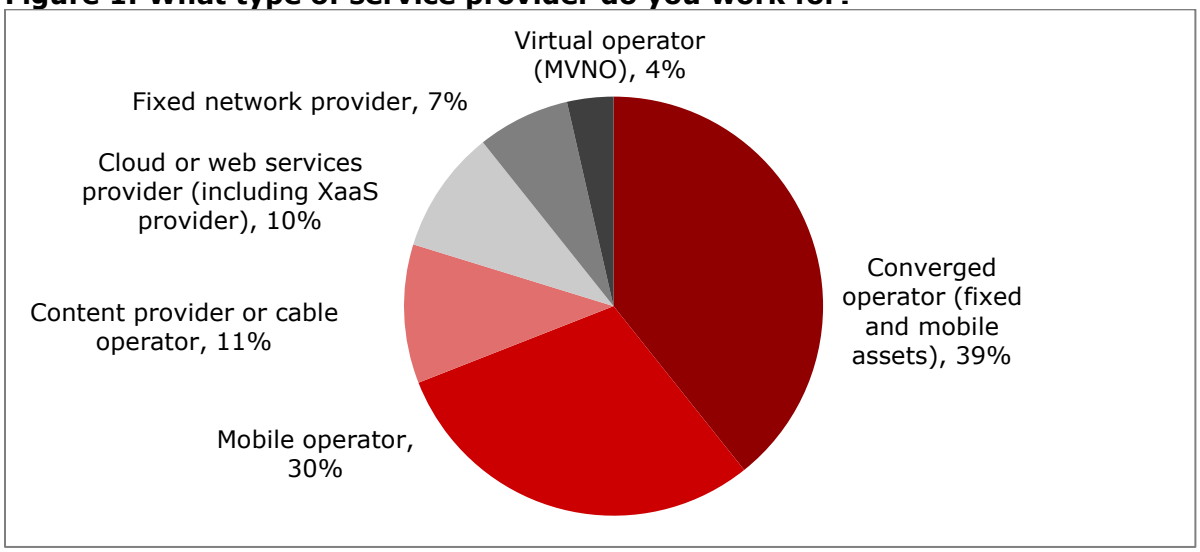
SURVEY DEMOGRAPHICS

The Heavy Reading **AI Acceleration in Data Center Service Provider Survey** was conducted online during May and June 2022. The questionnaire was written by Heavy Reading with input from project sponsors CoreSite and Ericsson. It was promoted to the Light Reading service provider database and received 84 responses from individuals working for operators with mobile network businesses (spurious, incomplete, and non-operator responses were removed). All responses are confidential and are only presented in aggregate form. Heavy Reading does not share individual names or company names from the survey.

Figure 1 shows the responses by operator type. 76% of respondents work for network operators, including 39% working for converged operators, 30% for pure-play mobile operators, and 7% for fixed network operators.

The remaining respondents are split between content providers or cable operators, cloud or web services providers, and virtual operators. This mix allows Heavy Reading to compare the responses from pure-play mobile operators versus all operators with reasonable confidence. Whenever the analysis in this report contrasts the largest and the smaller operators, it is made clear in the text.

Figure 1: What type of service provider do you work for?



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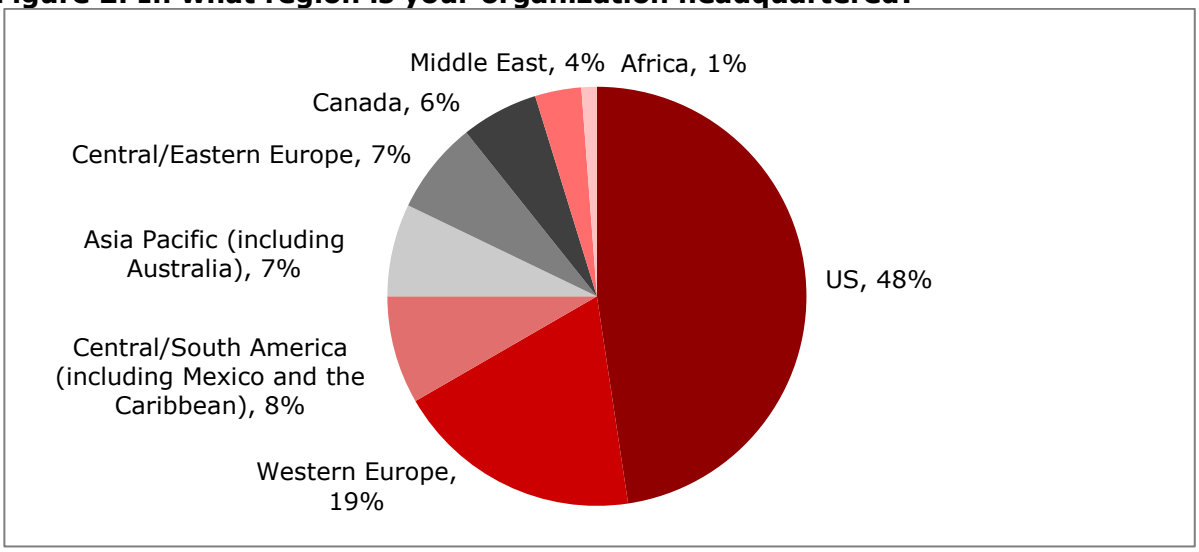
Source: Heavy Reading

Figure 2 shows the response by geography. The US is the largest market represented in the survey, with 48% of the response. 26% of respondents work for organizations headquartered in Europe.

Figure 2: In what region is your organization headquartered?



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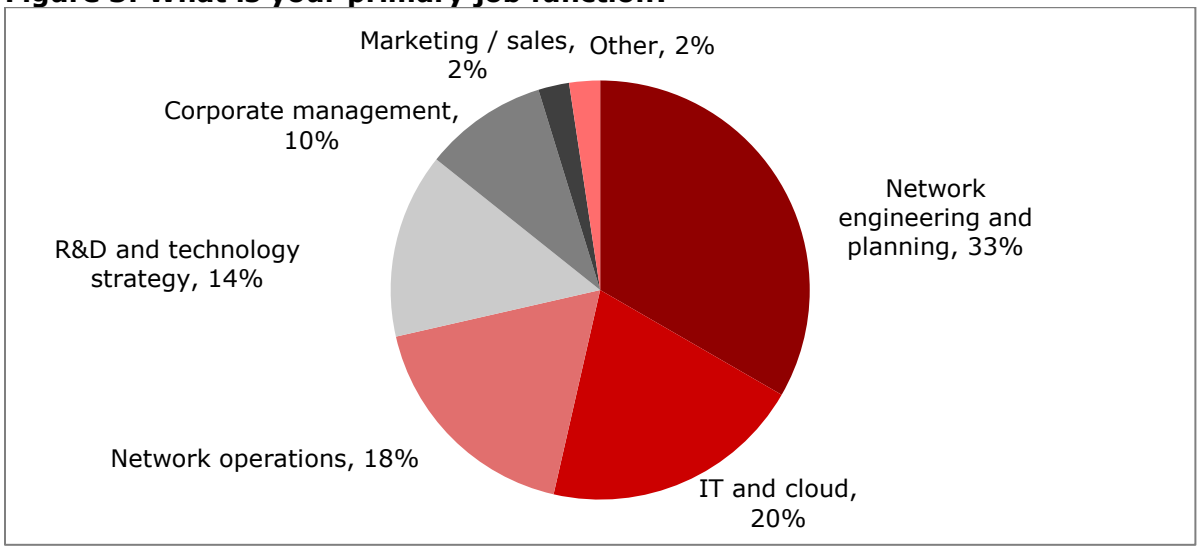
Source: Heavy Reading

Figure 3 shows responses by job title. Network engineering and planning is the largest group (33%), followed by IT and cloud and network operations.

Figure 3: What is your primary job function?



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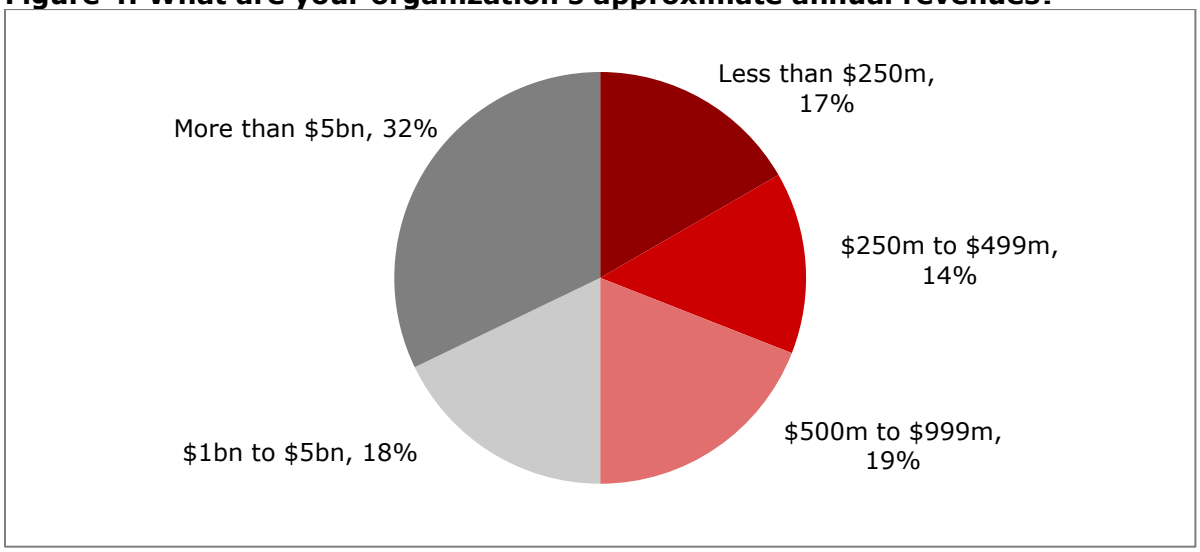
Source: Heavy Reading

Figure 4 shows organizations' approximate annual revenues. Half of the respondents are from operators with more than $1bn in annual revenue, and 32% are from operators with revenue of more than $5bn. This mix allows Heavy Reading to compare the responses from the largest operators (>$5bn) versus the smaller operators with reasonable confidence. Whenever the analysis in this report contrasts the largest and the smaller operators, it is made clear in the text.

Figure 4: What are your organization's approximate annual revenues?



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Source: Heavy Reading

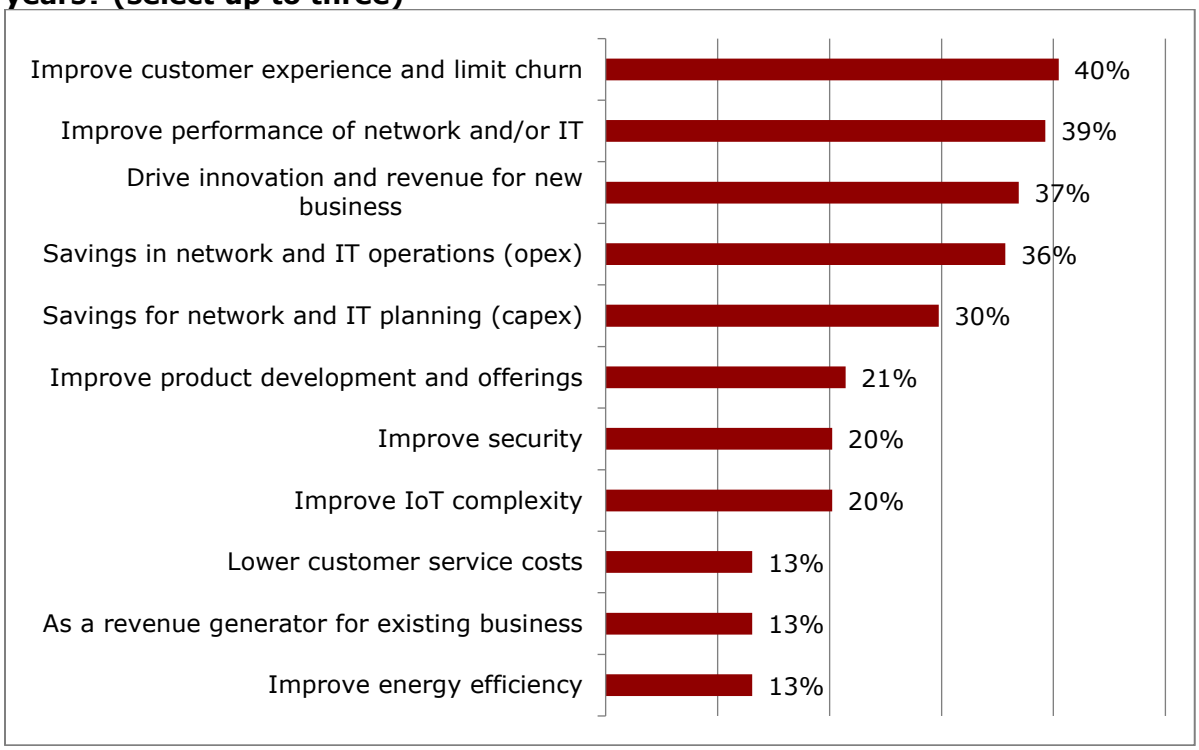
THE AI OPPORTUNITY

The first result from this Heavy Reading survey highlights the key benefits for service providers from using AI. For this question, respondents were asked to select up to three from a randomized list.

The leading benefits selected by respondents were improving customer experience and limiting churn (40%), improving network and/or IT performance (39%), and driving innovation and revenue for new business (37%). The results shown in **Figure 5** also highlight expected savings in both the opex and capex for network and IT.

Taken together, these responses show the significant opportunities to increase revenue through new services and new customers while retaining existing customers and reducing the costs that deploying AI in data centers and networks can incur.

Figure 5: What are the biggest potential benefits of using AI over the next five years? (select up to three)



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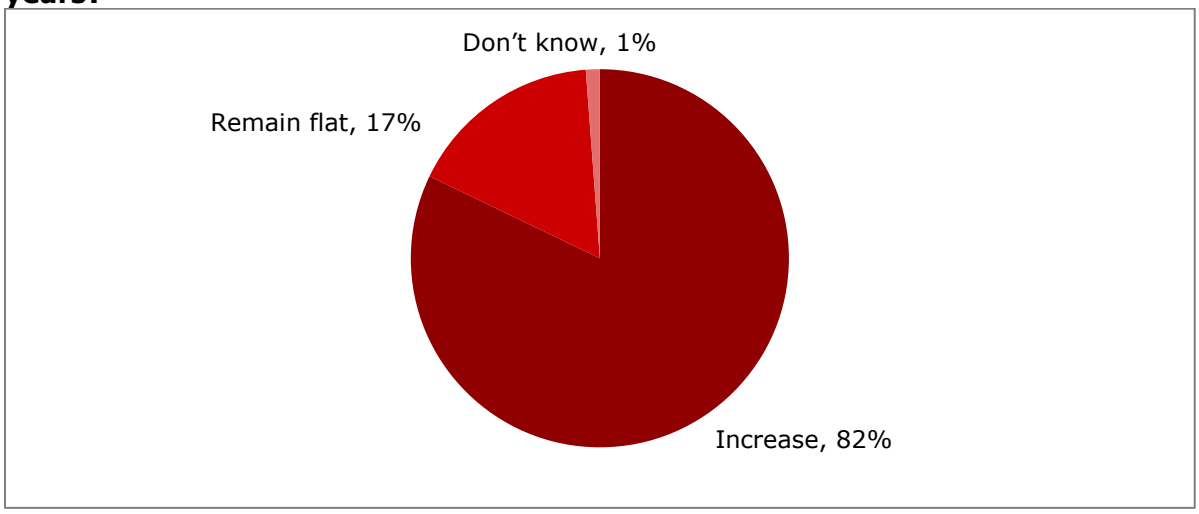
Source: Heavy Reading

Figure 6 shows how Heavy Reading's respondents expect their use of AI/ML will change over the next five years. The overwhelming majority (82%) expect their use of AI to increase. 17% expect the use of AI/ML to remain flat, and none expect the use of AI/ML to decrease.

Figure 6: How do you expect your use of AI/ML to change over the next five years?



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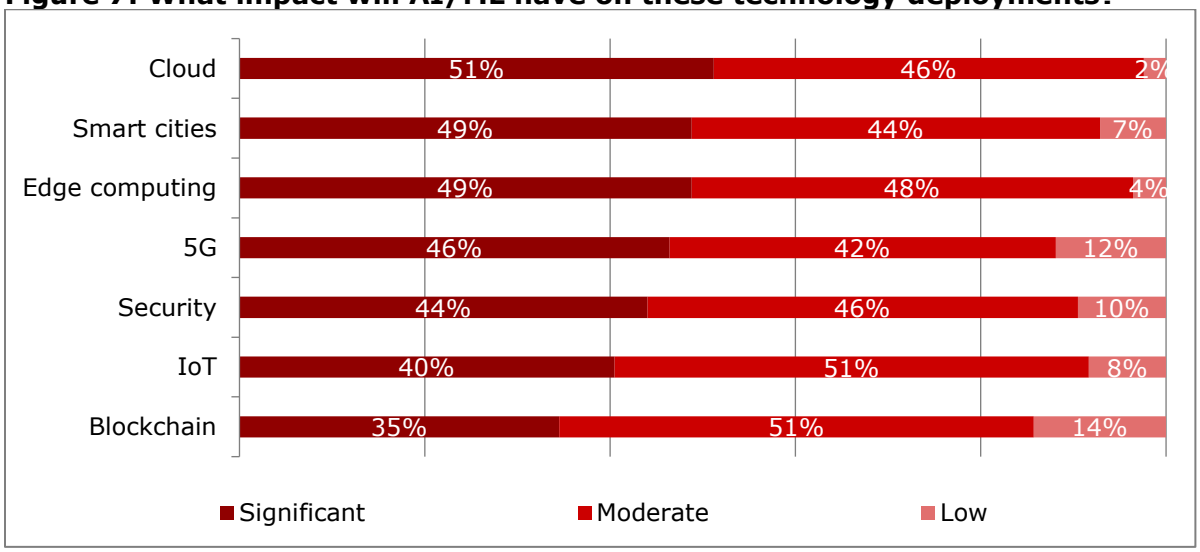
Source: Heavy Reading

Heavy Reading also asked respondents what impact they expect AI/ML to have on key technology deployments. As shown in **Figure 7**, more than half expect AI to have a significant impact on cloud deployments, and almost as many expect AI to have a significant impact on smart cities (49%), edge computing (49%), and 5G deployments (46%). Others expect AI to have a significant impact on security (44%) and IoT (40%).

Figure 7: What impact will AI/ML have on these technology deployments?



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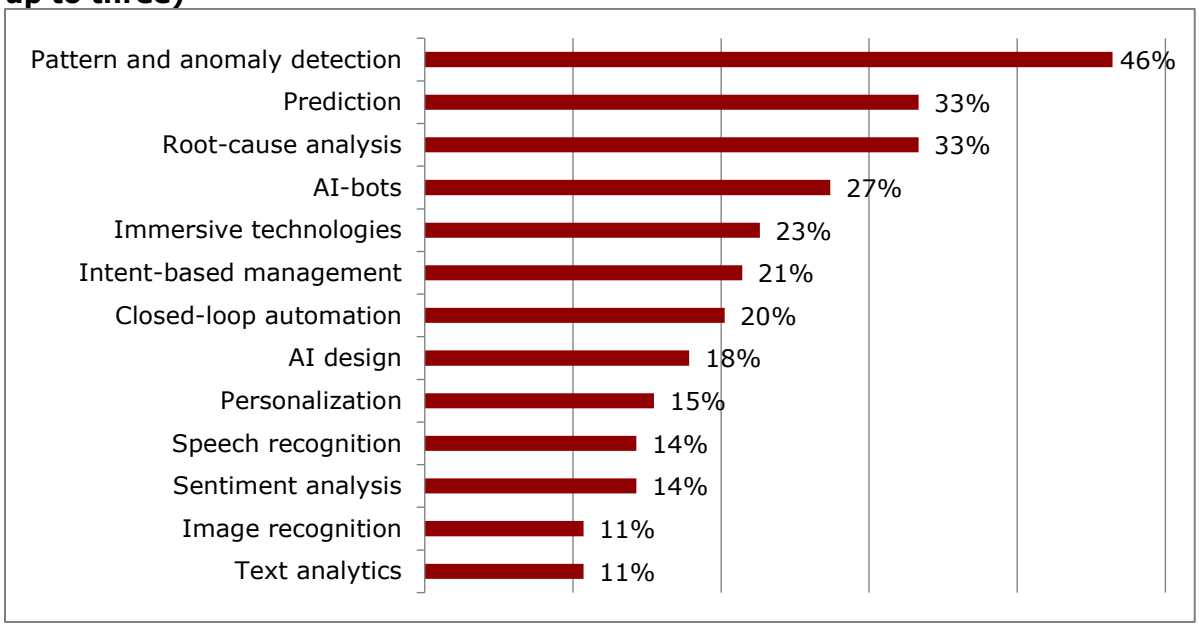
Source: Heavy Reading

Digging deeper into the use of AI, Heavy Reading asked respondents to select up to three AI technologies that they think are the most promising for their business (see **Figure 8**). Pattern and anomaly detection emerged on the top, followed by prediction and root-cause analysis, which were selected by one-third of respondents. AI-bots were selected by just over one-quarter of respondents. Two promising upcoming AI technologies, intent-based management and closed-loop automation technologies, were selected by approximately 20% of respondents.

Figure 8: What AI technologies are the most promising for your business? (select up to three)



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Source: Heavy Reading

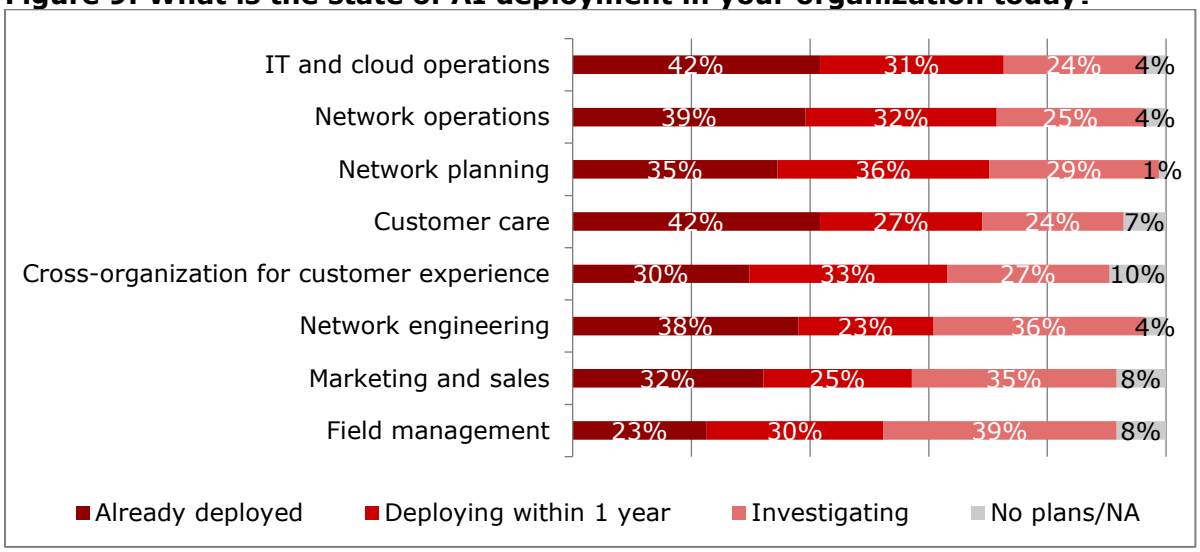
CURRENT AI LANDSCAPE

This next section looks at the current AI landscape, how companies are deploying AI, and the use of AI/ML tools and platforms.

As shown in **Figure 9**, many use cases are already deployed or are planned to be deployed. More than 70% said their organization has already deployed AI or will be deploying AI within one year for IT and cloud operations, network operations, and network planning. This demonstrates the significant impact that AI is already having on cloud and network infrastructure operations and development.

More than 60% said their organization has already deployed AI or will be deploying AI within one year for customer care, customer experience, and network engineering. More than half said their organization has already deployed AI or will be deploying AI within one year for marketing and sales and field management.

Figure 9: What is the state of AI deployment in your organization today?



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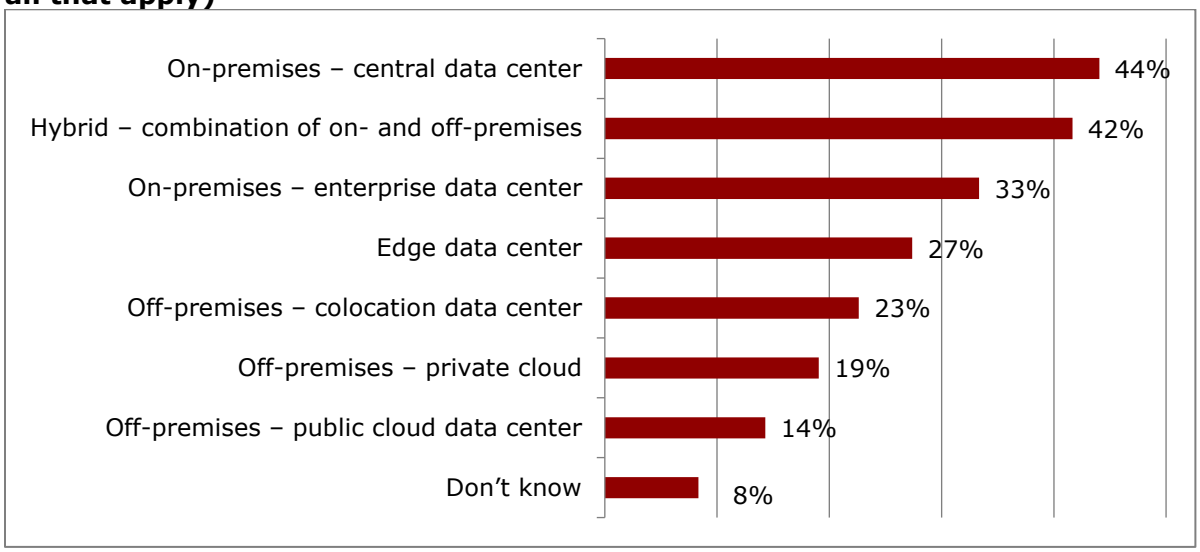
Source: Heavy Reading

AI applications typically access and use large databases, so the ability to store and access data is critical to success. **Figure 10** shows where respondents say they are storing and accessing data for AI applications. This largely reflects where AI workloads reside today and is dominated by on-premises data centers. More than 40% said they are storing and accessing data for AI applications in on-premises central data centers and a combination of on- and off-premises data centers. In the future, there will likely be a shift toward off-premises locations for AI application data that will reflect the shift in where AI workloads reside (see **Figure 20**).

Figure 10: Where are you storing and accessing data for AI applications? (select all that apply)



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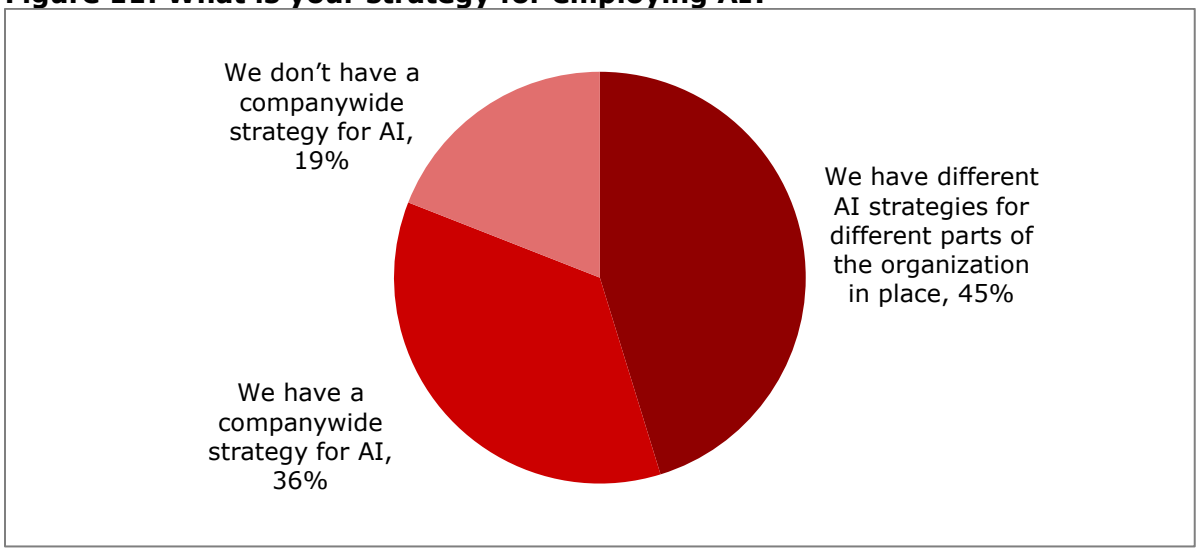
Source: Heavy Reading

For this next question, Heavy Reading was keen to understand if companies have a single companywide strategy for AI, are implementing specific departmental AI strategies, or do not have a companywide strategy for AI.

As shown in **Figure 11**, 45% have different AI strategies for different parts of the organization, and just over one-third (36%) have a companywide strategy. The results suggest that 64% of service providers have yet to develop a companywide strategy for AI.

Figure 11: What is your strategy for employing AI?



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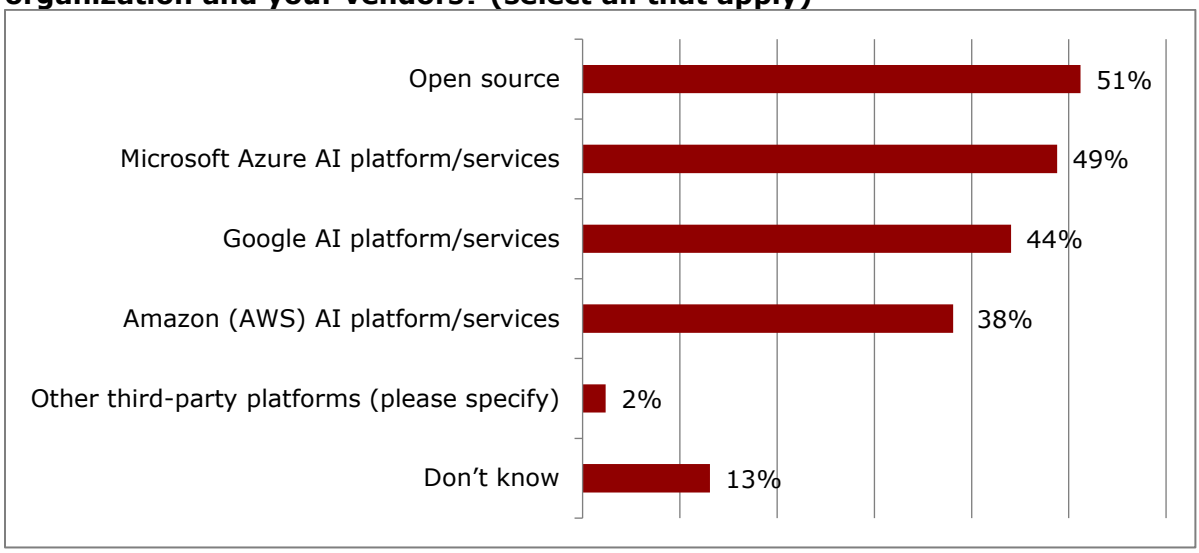
Source: Heavy Reading

Figure 12 shows which AI/ML tools and platforms are being used today by the organization and vendors of the respondents. Open source and the top three cloud platform providers dominate in this area. More than half said that open source solutions are used by their organization or vendors. Microsoft Azure is ahead of the other cloud service providers in these survey results at 49%, followed by Google and Amazon (AWS).

Figure 12: What AI/ML tools and platforms are being used today by your organization and your vendors? (select all that apply)



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Source: Heavy Reading

CHALLENGES TO IMPLEMENTING AI

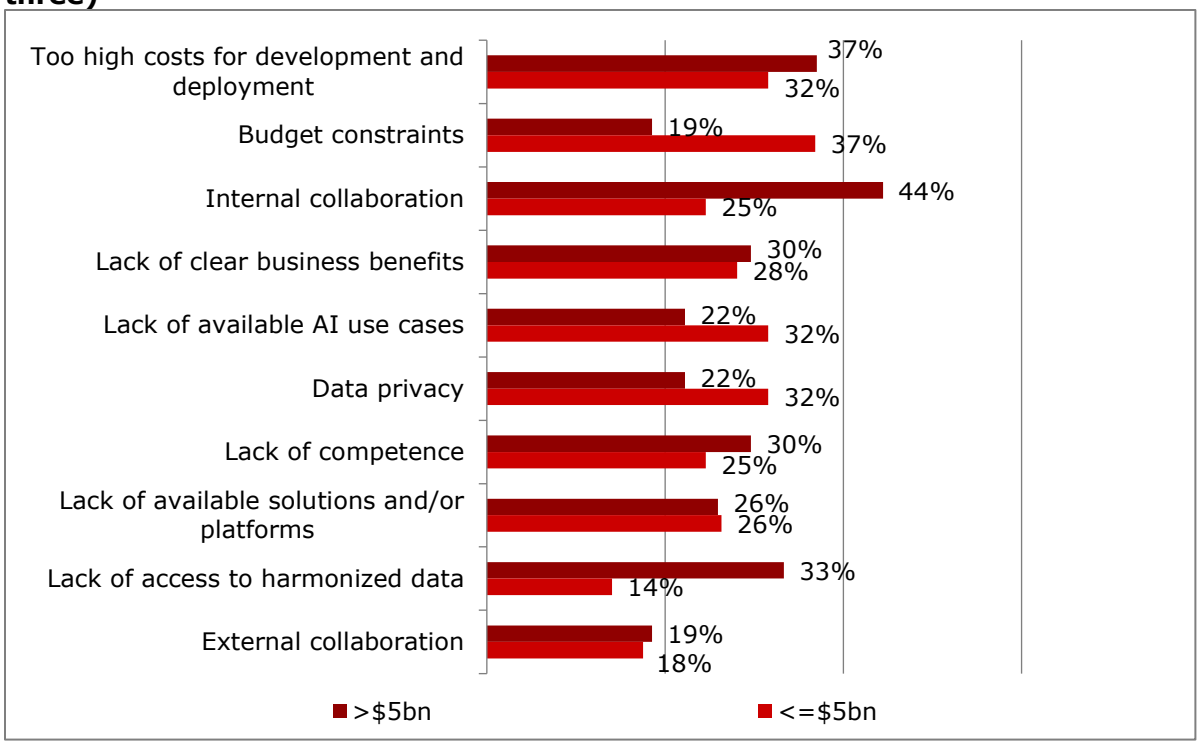
This next section covers the challenges that respondents see in implementing AI, developing in-house capabilities, and purchasing key components.

For the first question, Heavy Reading asked respondents to select up to three challenges that they as see as the biggest barrier to implementing AI. For this question, there are some significant differences in the results between the largest organizations (>$5bn) and smaller organizations, as shown in **Figure 13**.

Approximately one-third of respondents across organizations, both >$5bn and <=$5bn, saw costs for development and deployment being too high as a serious challenge in implementing AI. More than one-third (37%) of respondents from organizations with <=$5bn saw budget constraints as a serious challenge in implementing AI versus 19% from larger organizations (>$5bn). A significantly higher percentage of respondents (44%) from the largest organizations saw internal collaboration as a serious challenge versus 25% from smaller organizations.

Lack of available AI use cases or data privacy were seen as significant challenges by 32% of respondents from smaller organizations (<=$5bn), compared to 22% for the largest organizations. Approximately one-third of respondents from the largest organizations saw lack of competence or lack of access to harmonized data as serious challenges versus 25% and 14%, respectively, for smaller organizations.

Figure 13: What are the biggest challenges in implementing AI? (select up to three)



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Source: Heavy Reading

Heavy Reading also asked, "How challenging is it to develop the following competencies in AI/ML adoption within your organization?" The results are shown in **Figure 14**.

AI platform development competence is highlighted as a significant challenge by 36%, although 23% see this as a minor challenge or not a challenge. One-third see AI use case development competence and AI business understanding as a significant challenge. A total of 94% see AI business understanding as a significant or moderate challenge, and 91% see data readiness and governance as a significant or moderate challenge.

Figure 14: How challenging is it to develop the following competencies in AI/ML adoption within your organization?

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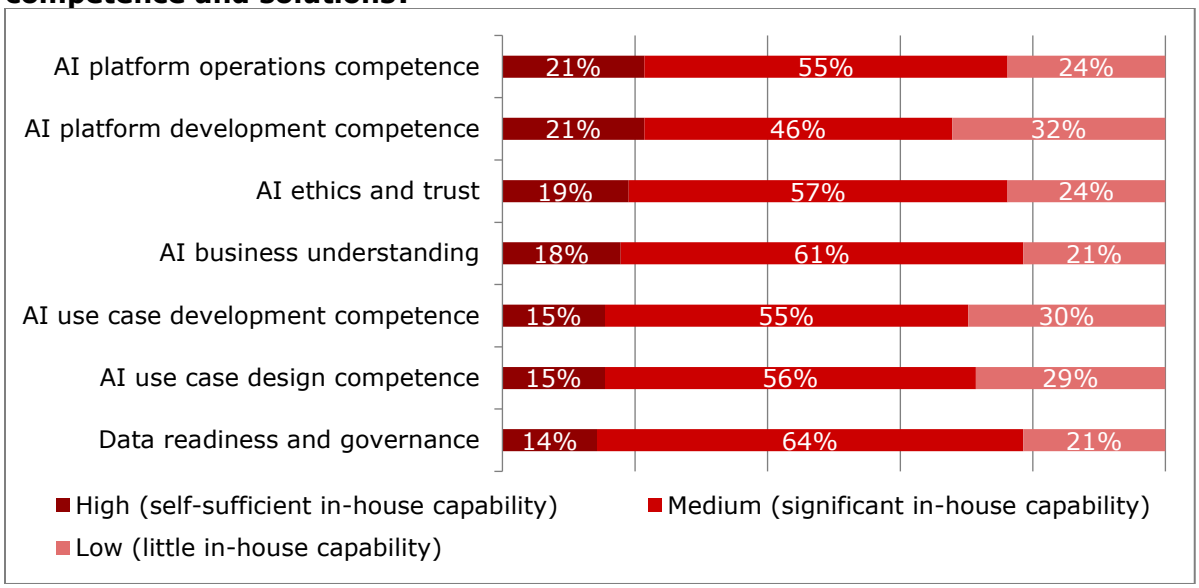
Source: Heavy Reading

Figure 15 shows in-house capability with regard to AI competence and solutions. Just 21% see their organization as having self-sufficient in-house competence for AI platform operations and platform development. 55% believe their organization has significant in-house competence for AI platform operations, but a smaller number (46%) see this for AI platform development.

For all these capabilities, 79% or more believe their organization does not have the self-sufficient in-house capability. They are therefore likely to need external support from vendors or will invest in expanding in-house capabilities and resources.

Figure 15: What is your organization's in-house capability with regards to AI competence and solutions?



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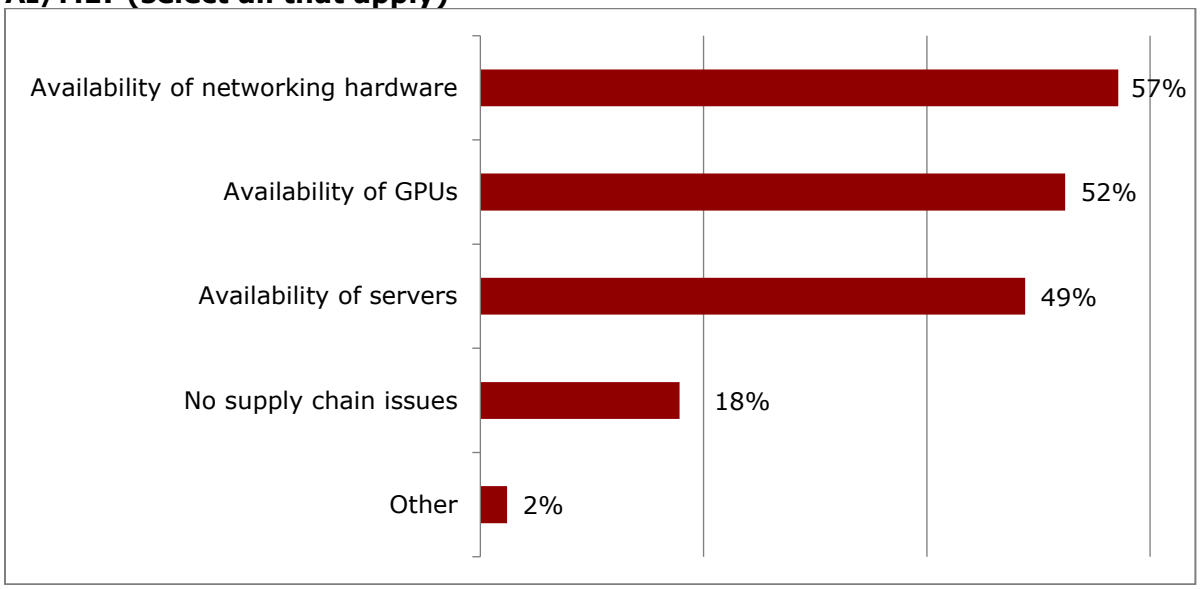
Source: Heavy Reading

When asked about supply chain issues, approximately half of respondents indicated issues with the availability of networking hardware, GPUs, and servers. Just 18% see no supply chain issues (see **Figure 16**).

Figure 16: Which supply chain issues are impacting your ability to implement AI/ML? (select all that apply)



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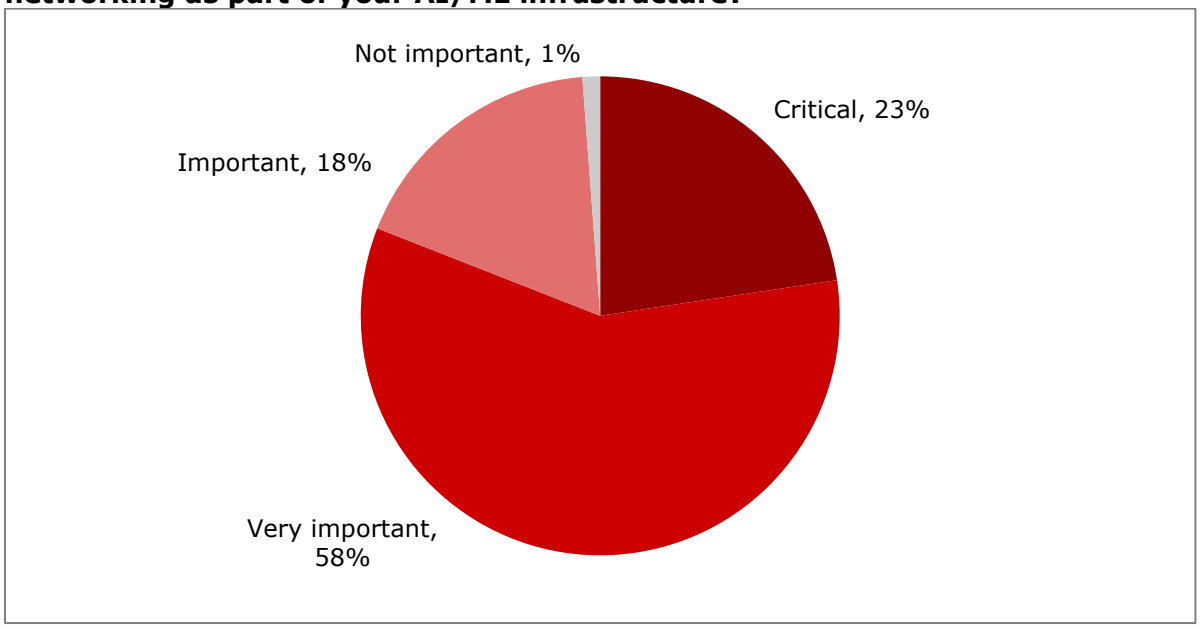
Source: Heavy Reading

THE WAY FORWARD – SOLUTIONS AND TRENDS TO IMPLEMENTING AI TECHNOLOGY

This last section covers the way forward and some of the solutions and trends to implementing AI technology.

81% of respondents said low latency networks/interconnection/cloud networking are either critical (23%) or very important (58%) as part of their AI/ML infrastructure architecture (see **Figure 17**). Just 1% see low latency as not important. Heavy Reading thus expects low latency networks to be a very significant part of AI/ML infrastructure architecture.

Figure 17: How important is low latency networks/interconnection/cloud networking as part of your AI/ML infrastructure?



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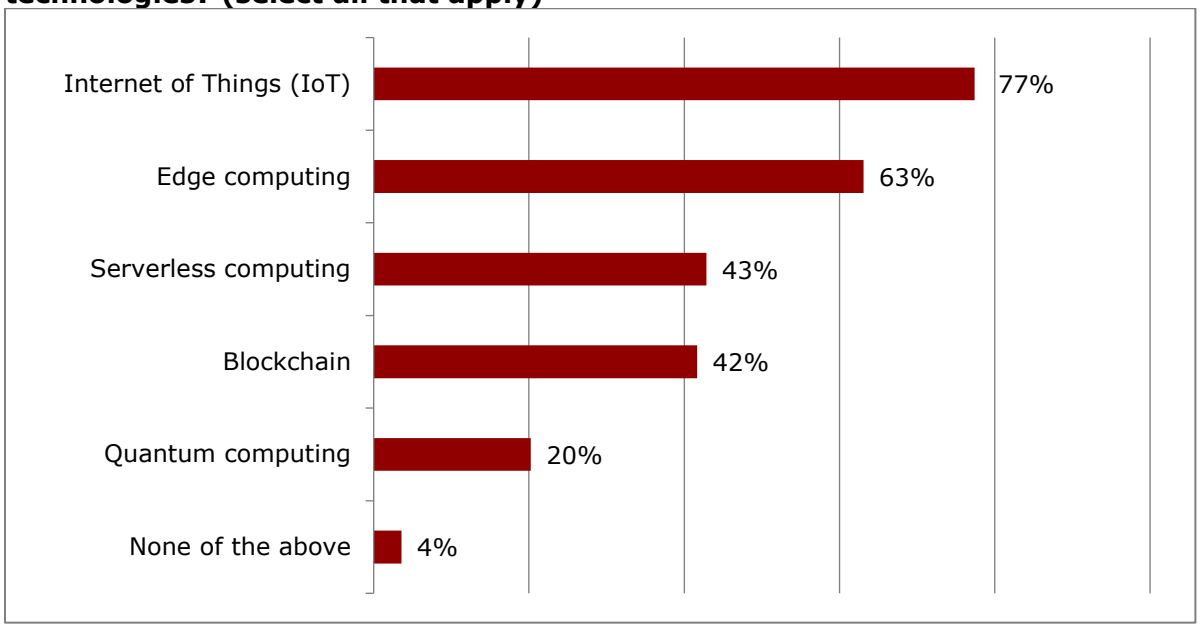
Source: Heavy Reading

Businesses are adopting many technologies in which AI/ML is likely to play a significant role. IoT and edge computing are being explored by the majority of organizations that Heavy Reading's respondents work for (see **Figure 18**).

Figure 18: Is your organization exploring adoption of any of the following technologies? (select all that apply)



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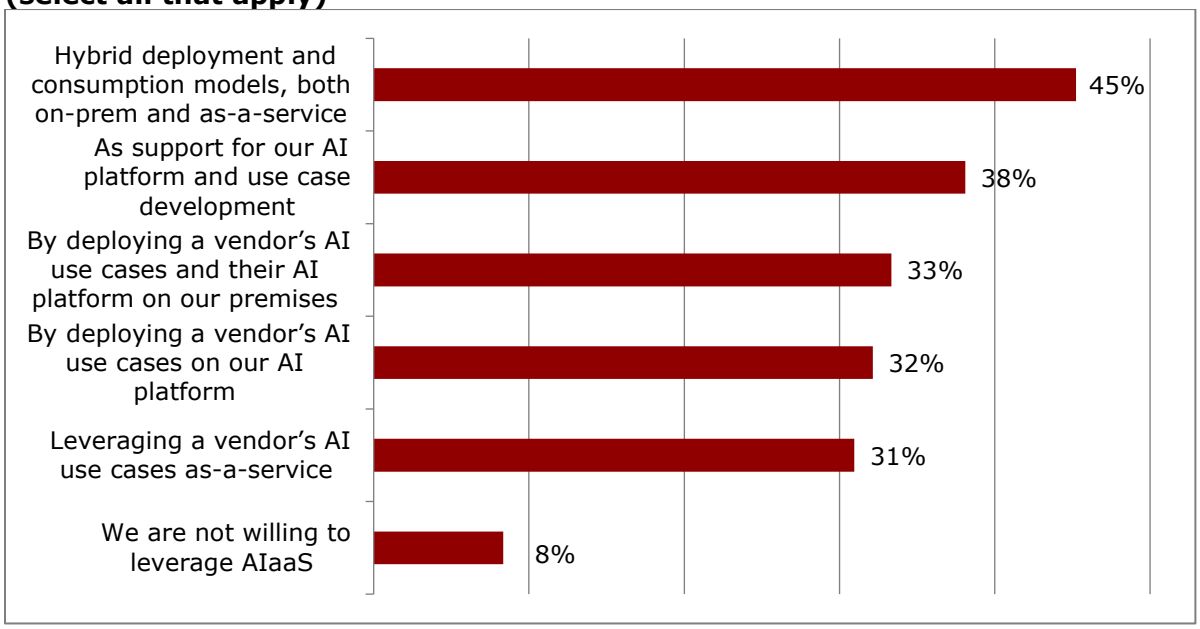
Source: Heavy Reading

AIaaS allows service providers to access AI/ML resources without investing in dedicated hardware and software. The results of the survey show that organizations are looking at multiple ways to leverage AIaaS. 45% of respondents said that their organization is willing to leverage hybrid deployment and consumption using both on-premises and AIaaS models.

92% of respondents are willing to leverage AIaaS, with several service use cases seen as applicable. 38% are willing to leverage AIaaS as support for AI platform and use case development. Approximately one-third are willing to deploy a vendor's AI use case and platform on their own premises, a vendor's AI use case on their own platform, or a vendor's use case as-a-service.

Figure 19: How is your organization willing to leverage AI as a service (AIaaS)? (select all that apply)



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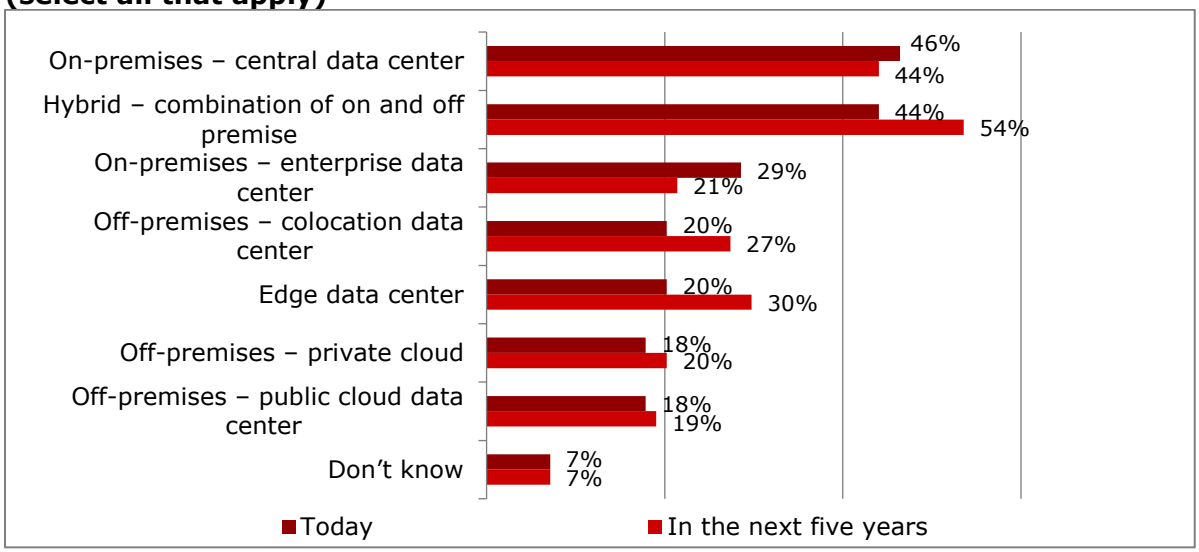
Source: Heavy Reading

The deployment of AI and ML is a continually developing opportunity for data center and network service providers. **Figure 20** shows where respondents said AI workloads reside today and in the next five years across all types of service providers.

46% said that their AI workloads today reside in on-premises central data centers, and 29% said their AI workloads today reside in on-premises enterprise data centers. In both cases, the percentage saying that workloads will reside in these on-premises data centers in the next five years declines—to 44% for central data centers and 21% for enterprise data centers.

In contrast, 44% said that their AI workloads today reside in a hybrid combination of on- and off-premises data centers, rising to 54% in the next five years. The use of off-premises colocation data centers and edge data centers also shows significant increases in the next five years.

Figure 20: Where do your AI workloads reside today and in the next five years? (select all that apply)



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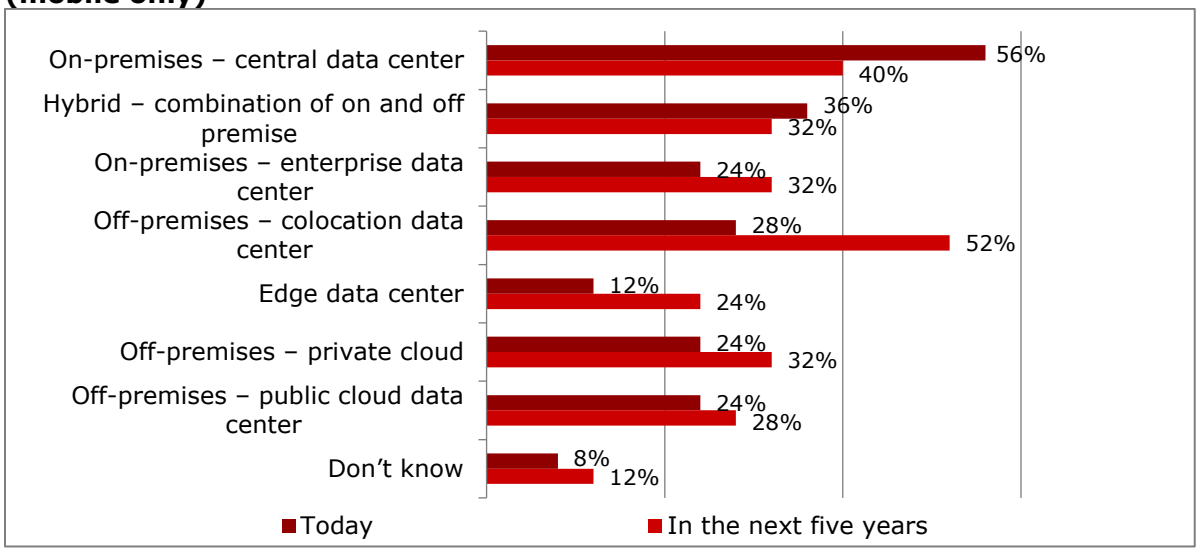
Source: Heavy Reading

This trend toward off-premises colocation and edge data centers for AI workloads, and away from on-premises, seems to be significantly more pronounced for mobile service providers (see **Figure 21**). For mobile operators only, AI workloads residing in on-premises central data centers will drop from 56% today to 40% in the next five years. Off-premises colocation data center AI workload deployment will grow from 28% today to 52% in the next five years. There is also a very significant increase in the expected use of edge data centers for mobile service providers, growing from 12% to 24%.

Figure 21: Where do your AI workloads reside today and in the next five years? (mobile only)



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Source: Heavy Reading

CONCLUSIONS

This survey has highlighted multiple benefits from deploying AI that can lead to increased revenue and reduced expenses for service providers. The results suggest that investments in deploying AI in data centers and networks can deliver a valuable ROI. AI is expected to have a significant impact on key technologies that are being deployed today, including cloud services and 5G mobile networks. As such, Heavy Reading believes that AI will become a core part of many service deployments.

AI is already being deployed in many key areas, and most respondents expect AI deployment to grow over the next five years. There are some key challenges that organizations need to address to gain the most benefits from deploying AI. These challenges include the high costs for development and deployment, budget constraints, and internal collaboration. They can be overcome by developing in-house capabilities and resources, having a companywide AI strategy, and accessing external support from partners.

Low latency networks and AIaaS will play a significant part in AI/ML infrastructure architecture. Heavy Reading expects that the industry will continue to shift AI workloads toward off-premises colocation data centers and edge data centers within a hybrid infrastructure architecture. With the right investments in AI capabilities and resources, service providers can deploy AI in data centers and networks and deliver benefits across many market areas.