

# IDC FutureScape: Worldwide Enterprise Connectivity 2025 Predictions

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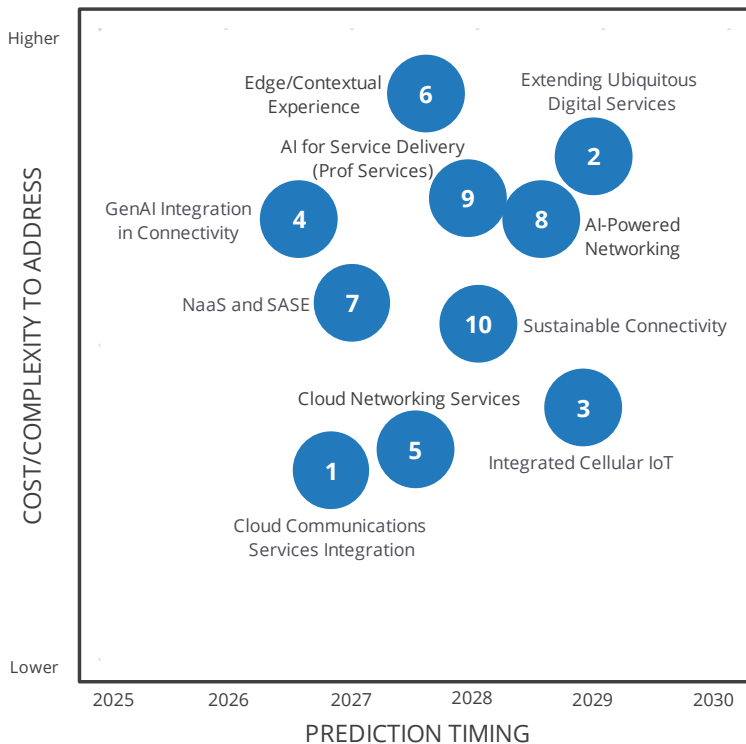
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## IDC FUTURESCAPE FIGURE

**FIGURE 1**

### IDC FutureScape: Worldwide Enterprise Connectivity 2025 Top 10 Predictions



Note: Marker number refers only to the order the prediction appears in the document and does not indicate rank or importance, unless otherwise noted in the Executive Summary.

Source: IDC, 2024

## EXECUTIVE SUMMARY

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For the past three years, IDC has defined the future of connectedness as enabling the timely movement of data across people, things, applications, and processes to create seamless digital experiences. As organizations move down their unique path to become agile and more connected, the future of connectedness framework has served as a foundation to help organizations address unevenness in connectivity across different environments and locations. It also helps them become more agile and resilient.

Today, the concept of connectedness has become an inevitable piece of the enterprise IT strategy and a more important subset of the goals of digital transformation. Over the past year, recent IDC surveys have shown that economic sentiments have improved. Worldwide approximately 69% of enterprises view 2025 as a year where economic forecasts will either be on par or will surpass expectations. As economic sentiments have improved, IT budgets have seen some incremental shift toward more connectivity-driven projects. More than half (53%) of enterprises also state that they already have increased spending on connectivity in 2024 over 2023.

As IDC has always reiterated, the ongoing evolution of connectivity within the communications service providers (comms SPs), cable MSOs, cloud hyperscalers, and tech suppliers shows that the endpoint for connectedness will remain a moving target. It will perpetually align to the enterprise IT strategy where constant improvements impact business agility, increase business flexibility, and allow the organization to adapt to change as market or business conditions shift. 5G networks are now pervasive, but one cannot argue that 6G networks with performance of terabit speeds are already hyped and on the horizon. Low Earth orbit (LEO) satellite technology is expected to bring high-speed connectivity to remote and rural areas that lack cellular or wireline connectivity options and enhance connectivity resiliency. AI, cloud connectivity, cybersecurity, application visibility, and performance management are all inevitable parts of the road map to becoming agile and connected (R.A.C.E.). These technologies will all become inflection points for organizations in their decision-making process of how to manage complexity and which service or technology provider will be the strategic partner to help them do just that.

Employees and customers have come to expect that any digital interaction with things, applications, processes, or other people is guaranteed no matter where, when, or via what medium they choose. As organizations continue down the path of becoming mobile and cloud first, most have already adapted to hybrid work and a distributed workforce. Today, employees, customers, and partners expect seamless digital interactions to mission-critical systems and processes from anywhere. The convergence of physical and digital workspaces, storefronts, and the evolution of smart spaces are

driving business leaders to align technology, policy, and operations together to drive agility and revenue.

IDC data shows that 30% of enterprises are seeing bandwidth demands increase by more than 50% per year, as data generation and traffic between on-premises and cloud-based applications continue to grow. The enterprise network must continue to scale to support the ever-growing volume of data coming from both inside and outside the organization. Today, organizations realize the importance of connectedness and are increasing investment to support these initiatives. More than 70% of enterprises expect to increase spending in network security, network APIs, unified communications, and cloud connectivity related initiatives and services to keep data moving. These investment areas, all of which lead to improved efficiency and more effective data movement, are at the heart of the 10 predictions in this IDC FutureScape. These predictions all align to the road map to the agile connected enterprise (R.A.C.E.) where appropriate steps toward an effective connectivity transformation enable more services and bring more effective use of data for real-time insights. The end goal will be a more resilient enterprise, more productive employees, and an organization that can adapt to business demands — not to mention new market requirements.

IDC's worldwide enterprise connectivity top 10 predictions are:

- **Prediction 1:** By 2026, 75% of enterprises will implement AI-enabled cloud communications APIs for seamless employee and customer engagement driving personalized marketing and revenue growth opportunities.
- **Prediction 2:** By 2028, 70% of enterprises will leverage LEO satellite connectivity to complement cellular coverage increasing resiliency by creating a unified digital enterprise service fabric.
- **Prediction 3:** By 2028, over 70% of enterprises will take advantage of cellular IoT applications, as Multi-IMSI SIMs and eUICC solutions, NB-IoT, and 5G evolution drive adoption of mission-critical business use cases.
- **Prediction 4:** By 2026, 90% of enterprises will integrate generative AI into their connectivity strategy to bolster network integrity, optimize network security, and create more personalized employee experiences.
- **Prediction 5:** By 2027, 70% of enterprises will adopt cloud-native networking for digital and AI workflows across on premises, edge, and multicloud, amplifying cloud providers' role as end-to-end connectivity suppliers.
- **Prediction 6:** By 2027, 45% of enterprises will enhance edge computing use cases with contextual experience, aided with GenAI, further aligning business outcomes with customer expectations and usability.

- **Prediction 7:** By 2026, 60% of enterprises will benefit from enhanced edge security, AI-enabled automation, and optimized operational efficiency by applying "as-a-service models" to SD-WAN and security.
- **Prediction 8:** By 2028, 50% of today's network engineering and operational tasks will be eliminated — or reduced to minor responsibilities — by AI-powered on-premises networking systems and public network services.
- **Prediction 9:** By 2027, 65% of network consulting engagements for datacenter networking will surround architectural design and testing to support complex AI and GenAI GPU connections prior to full deployment.
- **Prediction 10:** By 2027, 75% of enterprises will leverage service provider AI and telemetry expertise to accelerate adoption and automation of ESG use cases that improve efficiency and ensure regulatory compliance.

This IDC study presents the top 10 predictions for worldwide enterprise connectivity for 2025.

"As business continues down the path to becoming more digital, agile, and connected, investments in 5G, satellite, fiber, fixed wireless access, edge, IoT, and consumption-based virtual service offerings will be aligned to an AI-driven strategy that accelerates business benefits," commented Paul Hughes, research director, Future of Connectedness at IDC. "We expect enterprises continue to accelerate their connectivity transformation strategies to enable employees, businesses, and consumers to connect, share information, and complete digital transactions from anywhere."

## IDC FUTUREScape PREDICTIONS

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### Summary of External Drivers

- **AI-driven business models:** Moving from AI experimentation to monetization
- **The drive to automate:** Toward a data-driven future
- **Future proofing against environmental risks:** ESG operationalization and risk management
- **AI-driven workplace transformation:** Building tomorrow's workforce today
- **Expanding digital security frontiers:** Fortification against multiplying threats
- **Responsible and human-centric technology:** Ethics in the enterprise
- **Battling against technical debt:** Overcoming hurdles to IT modernization

## Predictions: Impact on Technology Buyers

### **Prediction 1: By 2026, 75% of Enterprises Will Implement AI-Enabled Cloud Communications APIs for Seamless Employee and Customer Engagement Driving Personalized Marketing and Revenue Growth Opportunities**

The most important benefit that organizations hope to achieve with their unified communications and collaboration (UC&C) solutions in the next 12–18 months is improvement of workflow management between employees on the customer-facing side of their business and the employees in the back office. AI in UC&C and CPaaS communications services, as well as CCaaS solutions, has proven itself to be a major driver of the seamless flow of data that is needed to deliver such benefits. According to IDC's August 2024 *Cloud Communications Services Survey*, from 50% to 60% of enterprises are already currently using AI in CPaaS for each of the following activities: identify usage trends, track interaction history, and personalize product preferences. These AI-based use cases not only improve the relevance and experience for customers but also enable more targeted and cost-effective business decisions to be made by sales, finance, and customer service employees.

The future brings with it even more AI usage that integrates UC&C, CPaaS, and CCaaS solutions. Companies are leveraging APIs to facilitate AI-driven agent assist chatbots leveraging NLP, and CDP, in the contact centers to manage simple tasks like product status or payments, leaving more complex tasks to human agents. IDC data shows that AI/GenAI capabilities are in the top 3 most important factors in selection of cloud communication platform vendor, according to IDC's August 2024 *Worldwide Cloud Communications and Datacenter Services Survey*. Furthermore, 96% of organizations, up from 86% last year, currently have or plan to build conversational customer engagement apps leveraging CPaaS — a single integrated engagement thread using multiple channels together (e.g., web, live chat, SMS, MMS, WhatsApp, and Facebook Messenger).

### **Associated Drivers**

- **The drive to automate:** Toward a data-driven future
- **AI-driven workplace transformation:** Building tomorrow's workforce today

### **IT Impact**

- Expect increased demand for UC&C solutions designed to ingest information from customer-facing apps. The growing use of AI in CPaaS APIs underscores the need for UC&C solutions to be designed to ingest and contextualize the

customer-infused information that has been gathered and synthesized from the CPaaS solution.

- Expect increased opex spending. The shift to cloud-based digital engagement platforms for marketing and customer services drives IT spending increases in the next two years.
- Note that successful implementation and usage will require increased need for IT-LOB partnership. Establishing a joint IT-LOB road map for future employee and customer engagement technology needs will help IT evolve its current UC&C and CPaaS approaches to ones that are seamless and future proofed.

## **Business Impact**

- Improved engagement and outcomes from prospects and customers
- More efficient employees and more cost-effective business decisions being made in product pricing, promotions, and warehouse and/or service delivery operations
- Greater confidence that seamless UC&C and customer solutions, such as CPaaS and CCaaS, can deliver tangible ROIs grounded in customer metrics to share with budget holders

## **Guidance**

- Seek use cases that best align with your company's business priorities.
- Bring together line-of-business and IT leadership early in the UCaaS and CPaaS platform selection process so that both are equally invested in integrating customer and employee experiences using these platforms.
- Look for both API and low-code/no-code tools in a CPaaS platform so that no integration is too great or too basic for your team. Alternatively, seek out cloud communications providers that have ready-made solutions that don't require additional coding. This is especially pertinent to small and medium-sized businesses (SMBs) with less programming resources or expertise.

## **Prediction 2: By 2028, 70% of Enterprises Will Leverage LEO Satellite Connectivity to Complement Cellular Coverage Increasing Resiliency by Creating a Unified Digital Enterprise Service Fabric**

As organizations look at the best ways to transform their connectivity strategy to ensure mission-critical functions are free from connectivity interference, a wireless-first approach has become embedded in IT planning. The outcome is a scalable and future-proof mix of wireless access technologies that includes 4G/LTE, 5G (NSA, SA [slicing]) FWA, MPN, and satellite to provide more robust connectivity service fabric and

underpin the digital business model. Communications service providers are now making strategic investments to build out next-generation digital infrastructure and expand the reach of their services for both public and private networks. Low Earth orbit satellite services will feature prominently in comms SPs' unified wireless plans for delivering satellite connectivity for consumer and business services, where deployment of fixed line broadband or terrestrial wireless is not economically viable.

Alliances will also become more significant as satellite operators pair constellations in LEO with comms SPs' mobile and fixed networks as consumer and business use cases emerge in various industry verticals. IDC's May 2024 *Telco Digital Transformation Survey* surveyed 100 global comms SPs, where 58% of the global telcos surveyed identified SpaceX (Starlink) as their preferred satellite operator partner. From a regional perspective, North American telcos identified SpaceX and Amazon Kuiper as their top choices, with EMEA telcos selecting SpaceX and SES. APAC telcos chose SES and SpaceX, with Latin America selecting SpaceX and both SES and OneWeb. The survey also identified that telcos would partner with more than one satellite operator. These alliances are in various phases, with some further advanced to deliver services beyond direct cell to satellite and messaging that include high-speed broadband internet, 4G/LTE and 5G broadband backhaul, and IoT services for B2B and B2C use cases. In addition, provide emergency satellite communications for disaster recovery incidents that cause damage to terrestrial mobile network equipment resulting in service outages.

LEO satellite technology is shedding the training wheels on its transformative journey, which will see constellations expanding and industries exploring new applications. According to the U.S. Government Accountability Office, they expect the buildout of satellite constellations to accelerate considerably. They are projecting about 58,000 satellites would be launched by 2030, the bulk will be LEO satellites. To put that into context, according to SpaceWatch Global, there are 10,019 active satellites in orbit, as of June 2024, and the majority (9,254) of these are LEO satellites, with two-thirds of which (6,646) belong to SpaceX (Starlink). Understandably, there will be challenges as more satellites are launched over the next few years, as congestion and the potential for catastrophic collisions and dangerous space debris become a potential concern. However, the positives are too compelling and will accelerate the deployment of LEO satellites as government subsidies and private investments have become more available to operators, driven by the benefits of LEO satellites to redefine connectivity for billions of consumers and millions of commercial customers around the world.

## Associated Drivers

- **The drive to automate:** Toward a data-driven future
- **AI-driven business models:** Moving from AI experimentation to monetization

- **Responsible and human-centric technology:** Ethics in the enterprise

## IT Impact

- Long-term alliances are increasing through the pairing of satellite operators' constellations in LEO with communications SPs' mobile networks to extend the reach of their unified wireless connectivity fabric.
- Organizations in specific verticals should explore applications that require lower-latency satellite connectivity option, in the range of 20–50ms, as part of their high-speed access choice for remote locations.
- LEO satellites will offer global connectivity capabilities for the deployment of IoT and MPN solutions but will require custom integration capabilities.

## Business Impact

- Communications SPs will evolve their network beyond terrestrial cellular with LEO satellite services that include direct satellite to cellular, high-speed broadband internet, 4G/LTE and 5G broadband backhaul, and IoT services. This technology innovation will drive competitive pricing integrated under one bill for network connectivity services.
- Cost-effective LEO satellite connectivity will help bridge the digital divide and open new economic opportunities for remote areas of the world, including new business markets for communications SPs and commercial applications.
- LEO satellites play a crucial role in global disaster recovery by providing reliable and rapid communication capabilities that will enable first responders to assess damage, coordinate relief efforts, and maintain communications when terrestrial infrastructure is compromised.
- LEO satellite connectivity will become increasingly prevalent due to the continued standardization effort in the 3GPP ensures 5G systems integrate NTN, such as high-altitude platform systems (e.g., LEO, MEO, and GEO satellites), with terrestrial options.

## Guidance

- Move quickly to line up mobile networks with satellite operator's constellations in LEO. The right partnership will be crucial for time to market of voice, data, and broadband use cases as well as wholesale capacity solutions.
- Identify optimal applications for low-orbit connectivity, with guidance from either satellite operators or communications SPs. Latency and reliability should be key considerations.
- Explore IoT and MPN applications that don't require always-on mission-critical capability for remote and geographically distributed sites.



## **Prediction 3: By 2028, Over 70% of Enterprises Will Take Advantage of Cellular IoT Applications, as Multi-IMSI SIMs and eUICC solutions, NB-IoT, and 5G Evolution Drive Adoption of Mission-Critical Business Use Cases**

The rollout of 5G networks has transformed the impact and use cases of IoT applications as the technology offers higher speeds, lower latency, and greater capacity essential for real-time data processing and high data throughput. As a result, cellular IoT applications are further revolutionizing industries by enabling remote monitoring, precise data collection, and efficient infrastructure management. Technologies like NB-IoT and LTE-M support wide area use cases with numerous low-complexity, low-cost devices that have long battery lives and low-to-medium throughput. As 2G and 3G networks are phased out, more IoT devices are transitioning to 4G and 5G networks, enhancing their capabilities and performance.

As enterprises, businesses, and organizations become increasingly interconnected, they must balance innovation with security while addressing integration complexity, cost efficiency, and driving business outcomes. While the enhancements in IoT cellular connectivity and applications offers immense opportunities, it also introduces significant challenges, including regulatory compliance, ensuring reliable connections across diverse regions, and managing complex networks with multiple partners. Overcoming these challenges is crucial for unlocking cellular IoT's full potential globally.

Global IoT projects necessitate seamless connectivity across regions, prompting providers to build robust partner ecosystems and improve network coverage. Multi-IMSI SIMs and eUICC solutions are vital for ensuring global communication, allowing devices to connect to various networks worldwide, and reducing operator dependence. Edge computing, AI, and machine learning are pivotal in analyzing vast amounts of IoT data, reducing latency and providing actionable insights that optimize processes, predict maintenance needs, and enhance operational efficiency. As IoT applications and devices proliferate, standardization and interoperability become essential, requiring common protocols and frameworks for seamless communication.

### **Associated Drivers**

- **AI-driven workplace transformation:** Building tomorrow's workforce today
- **Responsible and human-centric technology:** Ethics in the enterprise
- **The drive to automate:** Toward a data-driven future

### **IT Impact**

- Providers must integrate comprehensive security measures across all facets of an IoT initiative. In addition, they should offer specialized security services

tailored to the unique needs of mission-critical customers, as IoT deployments are prime targets for hackers and cybersecurity threats.

- It is imperative for IoT connectivity providers to establish robust global roaming partnerships and offer localized solutions in regions with regulatory and legal challenges related to roaming.
- Customers prefer solutions tailored to their specific needs. Thus operators should provide a comprehensive suite of services that complement each other to address diverse use cases. These services may include low-latency options, ultra-low-speed LPWA networks, private networks, higher-bandwidth networks, and various other configurations.
- IoT implementations are inherently complex, necessitating that connectivity providers collaborate with firms specializing in solutions, customer service, and other critical areas. Success in IoT connectivity hinges on cultivating an extensive network of partners, enabling providers to support customers in the seamless development and deployment of IoT projects.

## **Business Impact**

- Cellular IoT connectivity and applications empower organizations to monitor operations, assets, and supply chains in real time across various countries and regions. This real-time data collection offers valuable insights into performance, efficiency, and potential issues, facilitating proactive decision-making.
- IoT sensors enable organizations to globally track and manage assets such as machinery, vehicles, and inventory. Predictive maintenance helps avert equipment failures, reduce downtime, and optimize asset utilization.
- IoT-connected supply chains improve visibility and traceability. Businesses can track shipments, monitor temperature-sensitive goods, and ensure regulatory compliance during cross-border transportation.
- Enhanced operational efficiency leads to significant cost savings. Optimized logistics reduce transportation costs, predictive maintenance minimizes unplanned downtime, and energy-efficient processes lower utility expenses.

## **Guidance**

- Effective management of IoT applications, network, and operations begins with reliable connectivity, whether wired or wireless. Often overlooked, this connectivity forms the foundation of successful solution delivery and management, necessitating the use of advanced technologies and adherence to evolving industry standards.
- Service providers must actively deploy IoT solutions tailored to specific use cases and applications, understanding that each has unique network demands. Global carriers should customize their IoT offerings to meet these demands, whether

for asset tracking, predictive maintenance, or autonomous driving. Robust and reliable connectivity, supported by an agile, secure, and scalable platform, is essential for the success of IoT deployments.

- Ultimately, carriers should strive to simplify IoT applications, thereby reducing deployment time and minimizing customer headaches. This approach not only enhances the overall return on investment but also ensures smoother and more efficient IoT implementations.

## **Prediction 4: By 2026, 90% of Enterprises Will Integrate Generative AI into Their Connectivity Strategy to Bolster Network Integrity, Optimize Network Security, and Create More Personalized Employee Experiences**

IDC data shows that generative AI spending is expected to increase 65% from 2024 to 2025, with the largest share of spending increases coming from GenAI apps and services that are already in production. With data and bandwidth expectations to increase upward of five times in order to manage larger workloads, organizations are prioritizing infrastructure, operations alignment, and readiness as a key requirement for GenAI success.

To date, enterprise exploration and expenditure on generative AI for connectivity-specific programs has been incremental, but the expectation of its impact has now been realized. In 2023, less than 25% of enterprises expected GenAI to have a significant or transformative impact on connectivity programs. That number more than doubled in North America and APAC, with 47% and 51% expecting significant or transformative impact today.

The starting point for the technology at the network level is now focused on expanding capabilities of existing network data-intensive AI/ML-related functions and increasing automation of network management processes. The larger the enterprise, the more impactful this level of automation will be. IDC also expects it to be used by network managers and IT leaders to optimize network security and ultimately help align network investment planning as business and data demands change over time.

### **Associated Drivers**

- **AI-driven business models:** Moving from AI experimentation to monetization
- **AI-driven workplace transformation:** Building tomorrow's workforce today
- **The drive to automate:** Toward a data-driven future

### **IT Impact**

- Increased benefits of network data analysis that optimizes performance, predicts network congestion, and helps address security and fraud

- Greater visibility into long-term performance needs that can be aligned with network capacity planning
- Automation of core network management functions to help ensure connectivity resiliency and address network outages or service degradation quickly by using data intelligence to find, recommend, and even solve network operations problems

## **Business Impact**

- Increases the efficiency of NetOps staff by eliminating manual processes and removing data silos that may hinder the network management process
- Helps accelerate the path to digital first and future innovation by allowing complex processes to be handled digitally and eliminating risks from human error

## **Guidance**

- Note that generative AI remains aligned more with externally facing text, data, knowledge, and customer-centric processes. Application of the technology today should be positioned to solve a specific connectivity-related business problem or accelerate a business process.
- Ensure the C-suite has a full vision of GenAI impact, business benefits, timing, and how investment will impact network and bandwidth requirements in the short and medium term.
- Determine how the roles and responsibilities of key network and IT staff may change, based on changes in tasks that may move from human intensive to automated.

## **Prediction 5: By 2027, 70% of Enterprises Will Adopt Cloud-Native Networking for Digital and AI Workflows Across on Premises, Edge, and Multicloud, Amplifying Cloud Providers' Role as End-to-End Connectivity Suppliers**

Modern application workloads distributed across diverse infrastructure environments require networks that are scalable, flexible, automated, and deeply integrated with cloud-native architectures. Traditional enterprise networks are technically insufficient to meet the evolving networking demands of digital transformation projects or support the successful deployment of new technologies like generative AI.

Cloud-native networking solutions, driven by their software-defined principles, will be pivotal in providing the scalability and automation required to handle these dynamic workload environments. As enterprises increasingly adopt hybrid and multicloud strategies, networking must evolve to ensure seamless communication across on

premises, cloud, and edge. Cloud WAN services will play a crucial role at the lower layers of the network stack (up to Layers 3 and 4), by enabling quick connectivity and unified management of enterprise middle mile and core networks. In IDC's 2024 *IaaS Network Services: Requirements, Adoption, and Impact special report*, respondents highlighted improved network performance, reliability, and the adoption of IaaS cloud for applications as the primary demand drivers for choosing cloud WAN services.

Furthermore, AI workflows, which involve processes like data ingestion, analytics, training, tuning, and inferencing, mainly rely on data as their lifeblood. These workflows require high-throughput and low-latency connectivity to process vast data sets across distributed locations. As enterprises increasingly adopt both public and private AI models, the demand for high-performance site-to-cloud and cloud-to-cloud connections will grow. Cloud service providers, in conjunction with telcos and other connectivity providers, are well positioned to meet these demands globally, through an advanced set of IaaS network services. Enterprises will increasingly adopt more of these network services to provide enhanced load balancing, robust security, and intelligent traffic management while optimizing data flows across their network architectures.

Ultimately, the role of cloud service providers, alongside partnerships with telecom providers, and systems integrators will expand as they become end-to-end connectivity suppliers. As customers offload more of their networking responsibilities, providers offering comprehensive network solutions that integrate security, scalability, and automation will dominate. This shift will enable organizations to fully benefit from the flexibility, reliability, and resiliency of cloud-native networks.

## Associated Drivers

- **AI-driven business models:** Moving from AI experimentation to monetization
- **Expanding digital security frontiers:** Fortification against multiplying threats
- **The drive to automate:** Toward a data-driven future

## IT Impact

- Cloud-native network services will significantly reduce network deployment times compared with organizations building and managing their own networks. The automation and management tools by network service providers will help simplify network provisioning and configuration tasks, accelerating time to market for digital services and allowing IT teams to focus on innovation.
- Once flexible, cloud-native networks are deployed, other IT initiatives may be accelerated, particularly those that rely on getting data into and out of cloud-based AI/ML/analytics platforms. Potentially this may highlight other areas that also need improvement (for example in terms of their peak output/throughput or latency), that is removing one bottleneck may expose another.

## Business Impact

- By using on-demand and consumption-based charging models for IaaS network services, businesses can optimize costs and avoid large investments in network hardware and software infrastructure while scaling to meet peak demands or expanding globally.
- A cloud-native network fabric will ease the process of connecting to a wider set of partners, including ad hoc/temporary and real-time connections. This will support business innovation and agility and speed up internal/operational and external/customer-facing development.

## Guidance

- Fully understand how cloud-native network services could help you achieve your IT and business goals, as your network may be engineered and operated as a siloed technology domain today, but you envision a more unified network, compute, and application environment tomorrow.
- Consider in advance how you want to implement and manage these new networks — using your own IT and networking teams, using a managed service from an external partner, or using a combination of both. Don't assume that how you have managed your networks up to now is automatically right for the future — compared with managing legacy networks a whole new set of cloud infrastructure and networking skills will be needed.

## **Prediction 6: By 2027, 45% of Enterprises Will Enhance Edge Computing Use Cases with Contextual Experience, Aided with GenAI, Further Aligning Business Outcomes with Customer Expectations and Usability**

Edge computing is spurring the development of innovative use cases that require low-latency performance and/or address needs for data sovereignty and localization. These use cases span multiple industries such as healthcare, retail, manufacturing, and logistics. Depending on latency needs, edge computing infrastructure can be deployed on premises, service provider edge, or CDN edge. The success of these use cases is dependent on a solid ROI case as enterprises expect quantifiable benefits from investments in edge computing.

The business case for edge use cases can be further enhanced with GenAI. GenAI can enrich the customer experience by analyzing large data sets, generated from ongoing customer interactions. Customer experiences represent many elements that need to be analyzed to extract contextual relationships and assess implications on customer expectations. GenAI can be trained to align business outcomes with customer expectations leveraging these large data sets. The edge computing infrastructure is the

optimal framework to provide real-time inference of massive data sets to deliver a richer customer experience. GenAI can provide a contextual experience that provides a holistic view of customer behavior and intentions to align the outcomes with customer expectations.

## Associated Drivers

- **AI-driven business models:** Moving from AI experimentation to monetization
- **AI-driven workplace transformation:** Building tomorrow's workforce today
- **The drive to automate:** Toward a data-driven future

## IT Impact

- Investment in GenAI tools to support the development of innovative edge use cases is important.
- IT needs to provide access to large data sets representing customer interactions to allow GenAI to train models. Training can be performed in centralized cloud resources as it is compute intensive but not real-time dependent.
- Inference runtime environment needs to run on the edge computing infrastructure to ensure low-latency performance and address data localization needs.

## Business Impact

- Aided with GenAI, edge compute use cases will improve customer loyalty and will contribute to an increase in long-term customer value.
- Enterprises will better anticipate customer expectations and align their IT resources to deliver a richer customer experience.
- Contextual experience not only reinforces positive outcomes, but it also mitigates the effect of anomalies or unforeseen events. This will result in a satisfied customer.

## Guidance

- Enterprises should leverage emerging GenAI tools to drive toward contextual customer experiences. These experiences integrate several data points that provide a holistic view of customer experience.
- A key requirement is access to customer data in a secure and compliant manner. This data is key to training GenAI models.
- The edge compute infrastructure should be architected to have enough compute and storage capacity for the inference runtime environment to meet real-time and latency requirements of the edge use cases.

## **Prediction 7: By 2026, 60% of Enterprises Will Benefit from Enhanced Edge Security, AI-Enabled Automation, and Optimized Operational Efficiency by Applying "as-a-Service Models" to SD-WAN and Security**

A key challenge for enterprises in today's increasingly distributed IT infrastructure landscape is to ensure secure and predictable connectivity while controlling costs and enhancing operational efficiencies. In response, organizations across the globe are increasingly combining software-defined wide area networking (SD-WAN) technology with integrated cloud-based secure services edge (SSE) capabilities to create secure access services edge (SASE) architectures. These cloud-delivered, as-a-service offerings of SASE solutions represent a necessary adaptation to the complexities and vulnerabilities that have arisen from the digital transformation process and offer an important opportunity for more cohesive network and security operations for powering modern digital businesses.

The key challenge SASE solves is to enable secure connectivity for the hyper-distributed enterprise. Organizations today must support the optimized connectivity experiences for a range of users, devices, and internet-connected "things" that are more distributed than ever before across a range of enterprise campus, branch, datacenter, edge, and field deployments. Meanwhile, these distributed users and devices are accessing a distributed set of diverse on-premises and cloud-based resources, including SaaS and IaaS applications that businesses use to run the critical operations of their digital business. Legacy perimeter-based security architectures fundamentally do not scale to meet the needs of this hyper-distributed enterprise environment.

SASE architectures, with their integrated network and security features, delivered in a cloud-hosted model, are an ideal solution to overcome these challenges. Adding AI-enhanced management to network and security deployment and delivery increases operational efficiency, advanced automation, and security efficacy. The continued rapid adoption of SASE architectures, evidenced by IDC survey data, reinforces this point — IDC's recent global survey of SD-WAN users found 45% of respondents had deployed a SASE architecture, with another 30% planning to in the coming two years. Notably, there were significant discrepancies based on adoption by company size, however, with large enterprises (10,000 or more employees) adopting SASE at nearly four times the rate of small and medium-sized business (500–999 employees), indicating that SASE deployments can be complex to deploy and manage, especially for smaller organizations. Managed services offered by a range of communication service providers and technology partners can be essential in ensuring SASE success.

As organizations increasingly look to overcome the challenges created by their modern, distributed digital business operations, they're increasingly realizing the importance of



more integrated networking and security solutions that ensure high-quality connectivity, with trusted security, delivered in a cloud-managed model.

## Associated Drivers

- **The drive to automate:** Toward a data-driven future
- **AI-driven workplace transformation:** Building tomorrow's workforce today
- **Expanding digital security frontiers:** Fortification against multiplying threats

## IT Impact

- Ensuring secure network access to the realities of a modern, hyper-distributed digital business
- Guaranteeing security, reliability, and resiliency as the data and connectivity demands of the organization grow over time
- Ability to support multicloud and hybrid cloud deployments (including SaaS, IaaS, and platform as a service [PaaS]) and provide efficient and secure access to cloud resources independent of access methods — onsite, remote, or at home

## Business Impact

- Modern cohesive network and security architectures, like SASE, help enterprises modernize their connectivity strategy to ensure it reflects their modern digital business operations, enabling optimized connectivity, improved security of distributed users and devices, and improved operations.
- A key tenet of SD-WAN architectures is providing direct access to multicloud resources including IaaS, PaaS, and SaaS. With direct connectivity, users will enjoy improved performance and lower latency, all contributing to better cloud experience.
- Cloud-delivered security tools like SWG, ZTNA, and FWaaS provide a comprehensive set of protection against the vulnerabilities inherent in hyper-distributed enterprises.

## Guidance

- Consider partners, including technology vendors and managed services providers, that can assist in providing the right technology for your organization's use case, along with the services needed to successfully execute and manage the deployment.
- Explore the ways that AI-enhanced management can be used in SASE architectures, for enhanced management of network optimizations and troubleshooting to analyzing, identifying, and remediating network or security incidents.

- Ensure network architectures can accommodate for changing business needs and unpredictable traffic demands and can remain resilient when adverse network conditions occur (e.g., network outage, traffic spikes, intrusion by bad actor).

## **Prediction 8: By 2028, 50% of Today's Network Engineering and Operational Tasks Will Be Eliminated — or Reduced to Minor Responsibilities — by AI-Powered on-Premises Networking Systems and Public Network Services**

In this hyperconnected digital business environment, reformation of network architectures, technologies, staff, and management practices must accelerate as business and IT pressures continue to rise dramatically. Resilient, expansive, and dynamic networks connecting the network edge (e.g., remote workers, branches, stores, and things) and major sites (e.g., campuses, warehouses, factory floors, and hospitals) to private datacenters and public cloud services are increasingly critical, complex, and costly. At the same time, networking budgets, staff shortages, tool constraints, and legacy drag serve to undermine service delivery and advancement efforts. For organizations matching limited resources and skill sets against critical and complex requirements, engineering and operating a wholly efficient and fully effective network is becoming almost untenable.

Enter the more autonomous and AI-powered network of the future — a network that is more resilient and responsive on its own. Rather than adding to the many network-related burdens of today, a smarter and simpler network infrastructure provides much-needed relief — to the budget, to the staff, to IT, and to the business.

Network systems and services that leverage comprehensive intelligence and in-depth insights to direct or even execute precise "self-driving actions" reduce staff tactical engineering and operational responsibilities. Network deployments, monitoring, protection, problem-solving, and enhancements are all areas served by the smarter and simpler network. This more enlightened and energized network eliminates many of the mundane, laborious, and time-consuming tasks handled almost entirely by the networking staff today. And relief on the tactical side of network management enables the networking staff to take on more strategic roles and responsibilities — for example, network design and innovation, cross-IT collaboration, and digital business acceleration.

### **Associated Drivers**

- **The drive to automate:** Toward a data-driven future
- **AI-driven workplace transformation:** Building tomorrow's workforce today
- **Battling against technical debt:** Overcoming hurdles to IT modernization

## IT Impact

- Service levels and capabilities that match the network should align with those of other major IT domains (e.g., security, DevOps, and ever-shifting business demands and advancements).
- New and improved network infrastructure also bolsters networking and IT staff roles, skills, responsibilities, satisfaction, retention, and value, all positive forward movements for IT and the business.
- Best practices in networking will need to adapt to networking systems and services that are able to provide more data to IT and business functions; more insights into network conditions, trends, resource integrity, developing problems/threats, and need enhancements; and more direction and execution of engineering and operations actions.

## Business Impact

- The digital business model requires a resilient and dynamic technology infrastructure. Networks have been too static, for too long. This rather restrictive state is the fault of network technology, with all its complexity and constraints. Designs are slow to adjust. Systems are slow to adapt. Services are slow to activate. Slowdowns and failures are slow to correct. Smarter self-driving networks are able to move fast and, even more importantly, precisely. All this results in a network that better serves the business.
- Operational efficiency, worker productivity, customer experience, and business innovation are all top-ranked strategic business priorities according to IDC research. A smarter and more adaptive network and a networking staff that is more focused on the business and forward-looking IT initiatives are positioned to best deliver critical business outcomes and boost IT service levels and capabilities.
- Digital infrastructure resources — budgets, systems, services, data, application, and staff — must be managed tightly at all times. A network that leverages comprehensive observability, executes automated actions, and promotes proactive management is positioned to not only deliver consistent service to the business but also be ready to serve any business shifts — for example, new locations, new workflows, new regulations, and new customers. In essence, the network is ready for anything — and the networking staff are helping drive that "anything," rather than reacting to everything.

## Guidance

- Prepare for heightened investment and innovation in networking systems and services over the next two to three years. Many installed devices and software systems and management tools will not align to the more dynamic, automated,

optimized, and proactively managed network future. Smarter, simpler, and self-driving networking solutions should be in place well before 2028 for the network to help facilitate network staff to manage the network.

- Prepare to be more highly reliant on external partners, including both networking solution suppliers and all network-related service providers — cloud SPs, communications SPs, managed services, managed SPs, systems integrators, and VAR. As staff attention shifts toward more strategic responsibilities, smarter technology will be combined with outside experts and best practices.
- Prepare for a much-needed acceleration of staff development and reformation of roles and responsibilities of the networking team — and even those that have close ties to the network (e.g., SecOps, platform engineering). As systems and services take on more deployment and operational (and repair) associated with the network infrastructure, staff must be equipped and assigned to initiatives that drive greater IT and business value — and their own job satisfaction and skill set.

## **Prediction 9: By 2027, 65% of Network Consulting Engagements for Datacenter Networking Will Surround Architectural Design and Testing to Support Complex AI and GenAI GPU Connections Prior to Full Deployment**

Enterprise networks are becoming more complex, and business demands continue to drive increased expectations for higher levels of performance to the business. In parallel, enterprises are operating with smaller and less proficient networking teams. As such, organizations will increasingly turn to professional services partners to ensure they can deliver outcomes to the business. While this dynamic is not new for enterprise networking teams, the added complexity that GenAI workloads will bring to the enterprise and more specifically the datacenter network will require increased technical and operational expertise as the informational stakes for the business are higher.

According to IDC's August 2024 *Future of Enterprise Resiliency Survey*, 43% of organizations stated that GenAI would have a transformative and/or significant impact on their connectivity strategy and investments. Professional services firms will be able to provide the technology and operational expertise required to not only efficiently enable organizations to design the right network architecture within their datacenter environment but also benchmark, test, configure, and fine-tune network infrastructures to ensure it is performing optimally for GenAI workloads.

The introduction of new network paradigms for running GenAI workloads including new Ethernet speeds (40Gbps+), InfiniBand, and Fabric Mesh architectures gives enterprises choice, but they need to understand the impacts on design, operations, cost, security, skills, and process. IDC believes that network consulting and integration

services delivered by their services partners provide the comparative insights required for faster and more informed decision-making by utilizing labs, POCs, tested reference architectures, and best practices to enable enterprises to come to market faster with the GenAI initiatives within the datacenter environment.

## Associated Drivers

- **AI-driven business models:** Moving from AI experimentation to monetization
- **The drive to automate:** Toward a data-driven future
- **Battling against technical debt:** Overcoming hurdles to IT modernization

## IT Impact

- Moving the responsibility of datacenter modernization externally to network consulting and integration services delivered by professional services providers
- Embracing external support for testing and vetting architectural and operational best practices that new critical workloads require
- Gaining the ability to accelerate datacenter network deployments for GenAI and AI workloads

## Business Impact

- Accelerating the business benefits of more efficient AI-driven workloads to improve operational efficiency
- Allowing the business to focus on operations and alleviating the stresses of designing, managing, and implementing new network technologies that will align to future AI-driven business needs

## Guidance

- Your services partner should demonstrate thought leadership, best practices, investment in tools and processes, and certifications across a spectrum of networking technology partners to deliver the complex networking design and architecture that is required to support AI and GenAI workloads in the datacenter.
- Services firms must be able to demonstrate expertise across software (e.g., SONiC) paradigms as well as manual structure cabling of GPUs in the datacenter.
- Services firms must be able to provide business justification for any new networking investment across operations, people, and process including security best practices, sustainability of new network paradigms, and knowledge transfer and training costs associated with deployment of new network infrastructure of AI and GenAI workloads.

## **Prediction 10: By 2027, 75% of Enterprises Will Leverage Service Provider AI and Telemetry Expertise to Accelerate Adoption and Automation of ESG Use Cases That Improve Efficiency and Ensure Regulatory Compliance**

Sustainability remains an important priority for businesses, with certain regions taking a more focused approach to making strategic decisions that put ESG principles at the forefront. Data from IDC's 2024 *Future Enterprise Connectivity Survey* shows that 15% of organizations rank increased sustainability as a top 2 business outcome for any new or ongoing connectivity initiatives over the past 12 months, ranking just below revenue growth. Of those organizations, 71% saw at least a 20% improvement in sustainability metrics as a result of such focused investments.

Growth in data creation across the enterprise and increased focus on mobility and cloud put new stresses on organizations as they face the challenge of aligning greener processes with the need to scale and stay agile. Today, greater use of mobile applications, faster networks, cloud-first approaches that drive data and applications off premise, and new agile business and operational processes can transform and advance businesses forward as part of a greener, environmentally friendly strategy.

While agile network connectivity will play a critical role in helping enterprises achieve their environmental goals, the ability to continually monitor and manage key attributes remains a challenge. Even with the use of already intelligent service like software-defined WAN and secure access service edge, analyzing the entire landscape across fiber, broadband, cellular (4G/5G), and satellite will be a daunting challenge.

IDC expects enterprises will turn to their service providers to leverage their AI and telemetry expertise to accelerate adoption and automation of ESG use cases that improve efficiency and ensure regulatory compliance. Service providers have typically been ahead of the curve in adopting AI-driven technology and analytics tools to measure and track Scope 1–3 emissions, reusability, energy management, and environmental. These resources are of similar value to enterprises as they themselves aim for a greener footprint as they pursue more agile and connected technologies and business principles. With resources available with the service providers already, it will behoove enterprise IT leader to look to the domain expertise of their connectivity provider for trusted advisory services in this area as they pursue more connected digital initiatives.

### **Associated Drivers**

- **AI-driven business models:** Moving from AI experimentation to monetization

- **Future-proofing against environmental risks:** ESG operationalization and risk management
- **The drive to automate:** Toward a data-driven future

## IT Impact

- Expanding the role of the service provider partners to provide data-driven guidance on how to reduce complexity and consumption and accelerate the greener path to becoming and staying agile and connected
- Increasing the role of lower cost and consumption-based services like SD-WAN and NaaS
- Consolidating all analytics and tools to a common platform that uses service provider data and visibility to better manage traffic, increase automation, and lower costs

## Business Impact

- Reducing carbon footprint by partner-based AI capabilities that create greater visibility into how to support greener operations
- Allowing service provider partners to expand their role in supporting digital transformation and becoming the go-to partner for accelerating innovation

## Guidance

- Consider a broader relationship with the service providers as the go-to provider of larger green partner ecosystem and where digital business initiatives are aligned to current and future business use cases.
- Develop sustainable development strategies that leverage AI as the cornerstone for ensuring a greener path to business continuity and connectivity resiliency while adhering to and attempting to better local regulatory requirements.
- Monitor ESG initiatives within the larger value chain for connectivity hardware, software, cloud, network, and professional services partners to ensure that all parties embrace AI-driven processes that can benefit the enterprise as a whole.

## ADVICE FOR TECHNOLOGY BUYERS

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As 2025 approaches and enterprises look ahead to 2026 and beyond, the rosier economic outlook will likely play a role in accelerating enterprise planning and driving investments in digital-native initiatives. As such, staying competitive means organizations must adapt much more quickly to meet the needs of the employee, customer, and partner. The impact of data growth from generative AI, continued adoption of cloud networking, and related service and digitalization in general should not be underestimated. Looking ahead five years, enterprises network and IT strategies

should be built around the embrace of cloud, AI, analytics, and automation to provide an optimal experience for employees, not just to drive operational efficiency.

IDC offers the following advice for organizations as they continue down the path to becoming more agile and connected:

- As data and bandwidth demand increase today, look strategically at core assets that will ensure resiliency and scale well into the future. Examine connectivity solutions that can deliver cloud levels of scale to mitigate future challenges not just for network infrastructure but also for IT, external technology partners, and the business itself.
- Business agility cannot exist without a multinet access strategy that is core to business success. Decision-makers should invest in resilient access and backhaul that embrace multiple next-generation connectivity technologies such as 5G, SD-WAN, and NaaS to ensure the changing business demands are met in real time.
- As business complexity consumes internal resources, use managed connectivity services to alleviate business stress points. Choose a trusted service provider that offers managed services bundles that increase business performance, accelerate the road map to the cloud, and allow in-house staff and skills to be realigned around business outcomes.

## EXTERNAL DRIVERS: DETAIL

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### AI-Driven Business Models — Moving from AI Experimentation to Monetization

- **Description:** As the generative artificial intelligence (GenAI) hype settles into a new digital business reality, it's critical for both tech buyers and vendors to prove that "AI is real," can be monetized, and is leading to concrete business impact and revenue streams. While tech buyers' GenAI attention in the initial AI everywhere stages primarily focused on efficiency and automation-oriented use cases, the longer-term ambition is to leverage AI (including GenAI) to enable new business models and open new revenue streams. At the same time, after all the initial excitement and rush to new launches/announcements, it's time for tech vendors to capitalize on 2023–2024 AI investments, move customers' POCs to concrete multiyear deals, and unlock exponential AI monetization. While they implement this, companies must keep in mind that AI is not without risks, especially when it comes to ethical AI and data privacy. Enterprises need to carefully consider the best use cases in order to implement AI effectively and to the benefit of the organization.



- **Context:** With intelligence becoming a key source of value creation, we are in the midst of an "intelligence revolution," in which AI and automation-oriented technology are major accelerators of business change. GenAI especially is a transformative force. This branch of AI enables machine-driven autonomous creation of new content, from images to music to even written text, with remarkable accuracy. Current business applications of GenAI include content and code generation, as well as personalized recommendations, but it is evolving quickly.

## The Drive to Automate — Toward a Data-Driven Future

- **Description:** Broader automation use cases — which are different from just AI and generative AI — are now ubiquitous. Automating tasks that require human judgment and decision-making are becoming a key area of development. However, thoughtful implementation is crucial. This requires careful data management, quality, governance, and storage. Data quality and governance will become paramount as organizations strive to maintain accuracy in automation tools and comply with increasingly stringent regulations like GDPR and CCPA. Efficient storage and retrieval of vast data sets are also essential, prompting IT to explore scalable solutions like object storage or data lakes. As more employees access data tools and insights, fostering a culture of data sharing will be key. Breaking down data silos will be crucial for achieving a unified view for automation processes. This also means that while data generally becomes more open and accessible, protecting key information related to health, for example, becomes central to value and risk. Provided that data is thoughtfully managed, and silos are appropriately broken down, hyperautomation, the combination of multiple automation tools and technologies, may become more prevalent. This approach, which aims to automate as many processes as possible within an organization, can greatly improve efficiency and agility.
- **Context:** Businesses are rethinking how to employ automation to maximize operational efficiency — from automating assembly in manufacturing to identifying opportunities for food waste reduction in hospitality to improved CX in digital banking. And as data is embedded in the core of strategic capability for every organization, automation has become critical to scaling a digital business. This is evident in three domains: IT automation, process automation, and value stream automation — leading to autonomous operations, digital value engineering, and innovation velocity. From healthcare robotics to real-time data analytics, the applications are extensive.

## Future Proofing Against Environmental Risks — ESG Operationalization and Risk Management

- **Description:** Although the topic is often politicized, it is undoubtable that risks are multiplying in the form of extreme weather — droughts, floods, and irregular weather patterns in general are disrupting supply chains and wreaking economic havoc all over the world, increasing insurance/reinsurance costs. Accounting for this risk is increasingly seen as an imperative part of businesses' risk management strategy. Decreasing environmental footprints is also part of many businesses' efforts to become responsible enterprises. Frameworks such as environmental, social, and governance (ESG) support actions to achieve sustainability and contribute to a better future. In addition, ESG-related laws that oblige companies to account for this risk are increasing, including the EU's Corporate Sustainability Reporting Directive (CSRD) and Sustainable Finance Disclosure Regulation (SFDR), the SEC's climate disclosure requirement approved, and Japan's GX Basic Policy. Many companies are now actively operationalizing ESG with AI-informed carbon accounting software, carbon budgets, and sustainability requirements into requests for proposals (RFPs) they send to tech suppliers. In addition, many now have positions such as chief sustainability officer or are integrating sustainability into the responsibilities of the C-suite. They are also engaging in initiatives such as energy efficiency in technology. This is often an ecosystem-wide initiative, helping further advance meaningful risk management and development of best practices around climate/ESG.
- **Context:** Businesses are increasingly beholden to climate/ESG. More and more customers care about whether the companies they deal with behave sustainably and deliver sustainable products and services. ESG can also be a cost-saving measure and hedge against risks. Yet, despite much progress, there is still work to be done, especially in complying with carbon footprint measuring and achieving high-quality data. As laws and regulations — as well as investment opportunities — amp up around ESG, the IT industry will increasingly require green talent and skills and better data modeling of ESG metrics to achieve maximum benefit.

## AI-Driven Workplace Transformation — Building Tomorrow's Workforce Today

- **Description:** There are many pressures in the labor market, ranging from skills shortages to long-term demographic shifts. To increase automation and AI capabilities, digital skills are now in high demand, but the current supply of such skill sets does not match this demand. Despite talk about automation replacing

jobs, company growth depends more on reskilling to effectively make use of these investments. Expertise in security, cloud, and IT service management alongside AI skills are crucial. But enterprises can't live on IT skills alone — human-centric skills are also important, perhaps even more so than ever. Without proper socialization, awareness, and cross-organizational support, we may not see the innovation and productivity that GenAI and AI initiatives promise, and the overall enterprise IT strategy will be slow to deliver its needed results. To succeed, enterprises must also be open to organizational change and models that allow for greater trust and growth in their employees. Leaders must be accountable for laying the groundwork of communication, collaboration, creativity, and continuous learning, which will need to be pervasive for engineers and HR analysts alike. All of this lays the groundwork for long-term demographic shifts. Declining/aging populations means that the labor market is getting tighter. Fewer workers logically means that businesses will have fewer personnel. We have already seen talent shortages impacting businesses' operations. This will only get more competitive in the future. Business leaders are starting to fight against this, but success hinges on the ability of the enterprise to adopt better organizational strategies and models that allow for a more productive, collaborative, and learning-focused workplace.

- **Context:** The workplace has been shifting for some time, especially due to new modes of working, and the rise of AI and automation only further facilitates this shift. In the context of talent shortages, demographic changes, and other issues such as ESG concerns and ethical AI, it is clear that reskilling, upskilling, and overall transformation of workplace design are taking center stage. C-suite leaders and their teams must collaborate to recalibrate work culture, augmentation, and space/place planning to enable more secure, dynamic, and refined organizations of the future.

## Expanding Digital Security Frontiers — Fortification Against Multiplying Threats

- **Description:** The era of digital business has resulted in a significant increase in the interconnectedness of devices, people, applications, data, and networks, alongside movement of workloads to the cloud. However, this progress means vulnerability to increasingly sophisticated cyberattacks. Phishing remains the most common form of cybercrime, and with the addition of powerful AI models, fooling victims is much easier than it used to be. Cybercrime as a service is also booming, allowing malicious actors to act with more agility and efficiency than ever before. The rise of AI also enables accidental insider threats — well-intentioned employees could unintentionally leak or access restricted, sensitive data when using services, a trend already noticeable with generative AI services.

Finally, while quantum has not yet fully made it to the market, advances are marching forward, which also means that post-quantum cryptography is rising in importance. Organizations need to prepare for this and shift from reactivity to proactivity in their cyber-readiness and security postures. While this is already happening, the question remains as to whether organizations can sufficiently keep up with the pace of threats that are emerging. Cyber-resilience — the ability of an organization to anticipate, withstand, recover from, and adapt to any threats to its resources — is key for organizations to not only defend against cyberattacks but also prepare for swift response to and recovery from attacks.

- **Context:** According to the International Monetary Fund, cyberattacks have more than doubled since the COVID-19 pandemic. Cyberattacks have impacted all types of organizations, from governments to universities to businesses, and are oftentimes entangled in geopolitical motives. The increase in high-profile data breaches is furthermore leading to increased policy interventions regarding privacy and sovereignty. Organizations that are unprepared for cyberattacks may suffer various consequences, including data loss, financial implications, harm to their brand reputation, decreased employee morale, and loss of customers.

## Responsible and Human-Centric Technology — Ethics in the Enterprise

- **Description:** Enterprises are increasingly conscious of the broader societal impacts of their business models and of certain technologies, especially emerging technologies. Most topical at the moment is AI. AI may provide lower-cost, higher-value solutions, but it has significant ethical (and incipient legal) implications that companies will increasingly need to adapt to. There are significant questions over issues like copyright, trust, safety, and misinformation distribution. Beyond that, organizations must grapple with issues like privacy and consent around data, reproduction of biases and toxicity, generation of harmful content, insufficient security against third-party manipulation, and accountability and transparency of processes. As a result, countries around the world are keen to regulate AI, from the EU to Brazil to China. Aside from AI, new emerging technologies like quantum also have ethical challenges, and new branches such as quantum ethics are being developed. With quantum ethics, in light of the power of quantum computing, questions remain about how to ensure equity, transparency, and appropriate usage given its power to crack encryption. Roboethics grapples with the ethical questions that the use of robotics pose, especially those used in healthcare, military applications, and others. And beyond emerging technologies, supply chain ethics are also being questioned, as many raw materials such as critical minerals are mined under circumstances that

may implicate human rights questions, and jurisdictions from Canada to the EU to Japan have created laws requiring more stringent oversight of suppliers. Businesses are also still grappling with inclusivity and corporate responsibility. Having a diverse workforce can often be a benefit for businesses to ensure a greater amount of skill sets, and promoting corporate responsibility can be a way to attract and retain talent. And though these issues are often politicized, neglect of ethics in the business isn't just a moral quandary either — it is increasingly viewed as a significant business risk that can mean less trust, less control, and less ability to advance technologies in an optimal way.

- **Context:** AI is bringing the "S" (social) and "G" (governance) in ESG to the forefront of conversation in a way that is distinct from conversations around "E," the environment. Businesses are increasingly discussing AI ethics due to rising public and regulatory scrutiny, concerns about privacy and bias, and high-profile AI missteps. Adhering to ethical standards enhances reputation, builds consumer trust, and ensures sustainable, responsible innovation. This shift underscores the importance of developing and using AI technologies ethically and transparently.

## **Battling Against Technical Debt — Overcoming Hurdles to IT Modernization**

- **Description:** As technology becomes increasingly central to business operations, the role of IT leadership is evolving into business leadership, highlighting the critical importance of managing technical debt. This debt, exacerbated by the rapid advancements and growing complexity of IT systems, not only inflates maintenance costs but also poses significant challenges to operational efficiency, profitability, and market adaptability. Accumulated technical debt manifests in software bugs, security vulnerabilities, and system inefficiencies, leading to increased operational costs, data breaches, and a loss of customer trust. For developers, working with outdated systems diminishes morale and productivity, while businesses face hurdles in adapting to new technologies or market demands swiftly. Specifically, in the realm of AI, "data debt" — stemming from poor data quality, inadequate architecture, and insufficient documentation — complicates maintenance, reduces system flexibility, and hampers accurate decision-making. These issues, along with the struggle to maintain legacy systems and navigate technical heterogeneity, slow down development processes, delaying the launch of new features or products. There is a cascading effect that arises with technical debt (e.g., cloud laggards will become AI laggards).
- **Context:** In recent years, technical debt is a growing concern due to accelerated digital transformation, increased reliance on complex software systems, and the urgent need for rapid innovation. The pressure to deliver software quickly often

leads to compromises in code quality, resulting in a backlog of maintenance issues. Businesses face mounting pressure to address outdated code and quick fixes to maintain system reliability, security, and scalability amid evolving technological demands. As systems become more complex, the cost and effort to address these issues escalate, impacting operational efficiency and innovation.

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### Related Research

- *Critical External Drivers Shaping Global IT and Business Planning, 2025* (IDC #US52438224, August 2024)

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