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India's IT Leaders Set to Increase AI Investments in 2024

The annual survey conducted by CIO&L reveals that 68% of enterprises plan to boost AI investments in 2024, despite facing skill shortages and security challenges.

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The future is AI, but ...

While the future undeniably hinges on AI, organizations must proceed cautiously and strategically to maximize its impact.

Jatinder Singh

The future belongs to AI, a transformative technology reshaping how organizations work worldwide. The growing interest in AI is underscored by our State of Enterprise Technology Survey, whose findings are highlighted in the cover story of this edition. AI's role in enhancing process automation, boosting productivity, and empowering organizations to innovate and unlock new revenue opportunities is undeniable and inspiring.

Yet, it risks eroding trust—a concern echoed by many enterprises and IT leaders, including you.Establishing clear guidelines and regulations for AI use, especially in sensitive sectors like healthcare and finance, is crucial for building confidence among users and stakeholders.

The rise of Generative AI, the latest category of AI, has democratized the technology, showcasing its vast potential to a broader audience.

We're only at the dawn of what AI can achieve. Nevertheless, for businesses and leaders, choosing the appropriate technology poses a significant challenge in scaling AI deployments. Furthermore, AI demands substantial computing power to deliver quality outcomes. A CIO colleague, despite recognizing AI's potential, mentioned his struggle to efficiently run AI-driven applications within his existing data centers and cloud infrastructure.

The selection of algorithms, cited by 46% of respondents in our survey, critically influences performance, accuracy, and computational demands. Therefore, it's crucial to undertake algorithm evaluation, experimentation, and monitoring to detect potential biases, errors, and model drift.

Incorporating AI into current workflows demands acquiring fresh skill sets and undergoing comprehensive training to wield these tools adeptly. Concerns have been expressed about the potential overdependence on AI systems, which could diminish creativity and critical thinking skills in forthcoming generations.

While the future undeniably hinges on AI, proceeding with a sense of responsibility and strategic planning is essential to maximize its impact. Organizations must strive for increased productivity while recognizing the intrinsic value of human intelligence and intuition. ■

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Build-to-Suit Data Centres: The Best Answer to Your Data Centre Dilemma

The strategic advantages of build-to-suit data centres are crucial in solving enterprises' data centre infrastructure challenges, according to CapitaLand Data Centre.

The digital economy's evolution, driven by a surge in cloud computing, artificial intelligence, and machine learning, has pushed organisations to expand their data centre capabilities to meet increasing performance, flexibility, and security demands. However, the challenge is that traditional data centre solutions often need help to keep up, leading enterprises to explore new options.

One solution to this challenge is build-to-suit data centres, which enable the swift deployment of fully functional facili-

ties tailored to a tenant's needs, including power, cooling, and connectivity. The build-to-suit data centre model provides infrastructure solutions customised for the unique demands of modern businesses.

This model facilitates scalable growth aligned with the business's development, presenting a transparent cost structure. As companies face the challenges of data management and infrastructure scalability, build-to-suit data centres prove to be an effective solution. They offer customisable, scalable, and efficient infrastructure options, giving businesses the agility and control to navigate the ever-changing digital landscape effectively.

Here are the strategic benefits of build-to-suit data centres, highlighting their role in addressing today's enterprise data centre challenges.

Customization and scalability

Build-to-suit (BTS) data centres offer tailored solutions that can be precisely customised to meet enterprises' unique needs and growth requirements. Unlike traditional data centre options, which may have space, power, and cooling limitations, build-to-suit facilities provide the flexibility to design and deploy infrastructure that aligns perfectly with your organisation's objectives.

With build-to-suit data centres, enterprises can choose their facilities' location, size, layout, and specifications, ensuring that every aspect of the infrastructure is optimized to support their operations effectively. Whether it's a high-density computing environment, specialised cooling systems, or stringent security measures, build-to-suit facilities can accommodate diverse requirements and accommodate future growth seamlessly.

Moreover, the scalability inherent in build-to-suit data centres allows businesses to scale their IT resources dynamically as their operations expand. Whether adding more servers, storage capacity, or networking equipment, build-to-suit facilities can adapt to evolving demands without significant modifications or disruptions. This scalability ensures businesses can stay agile and responsive to changing market conditions while maintaining optimal performance and efficiency.

Cost-effectiveness

Build-to-suit data centres offer cost-effective solutions compared to traditional options by allowing businesses to optimise their infrastructure investments and avoid over-provisioning. Companies can precisely match their needs through tailored infrastructure design, avoiding unnecessary resource expenditures. This efficient resource allocation and the ability to scale dynamically minimize upfront capital expenditures and ensure optimal resource utilization.

Furthermore, build-to-suit facilities can reduce operational costs by incorporating energy-efficient technologies and customizable security measures. Unlike traditional options with vendor lock-in, build-to-suit data centres provide greater control over infrastructure and vendor relationships, enabling businesses to negotiate favourable terms and avoid unnecessary expenses.

Speed-to-market

Build-to-suit data centres offer a significant advantage by expediting infrastructure deployment, allowing enterprises to swiftly adapt to evolving business needs and technological advancements. With customisation integrated from the outset, there's no need for extensive retrofitting or adjustments, which streamlines the deployment process.

Coupled with streamlined processes and dedicated resources, build-to-suit facilities empower organisations to accelerate their time-to-market, providing them with a crucial competitive edge within their respective industries.

Enhanced control and security

Build-to-suit data centres offer a tailored infrastructure that meets and exceeds specific security needs, particularly for organisations that handle sensitive information.

These specialized data centres allow organizations to meticulously design and implement their IT infrastructure in a manner that ensures adherence to relevant regulations. This includes deploying advanced security measures such as robust access controls, end-to-end data encryption, and comprehensive audit trails. These features are instrumental in preserving data integrity and safeguarding against unauthorised access to sensitive information. By customising their data centre environment, organisations can create a fortress around their data, significantly reducing the risk of data breaches and ensuring that privacy standards are maintained.

By taking control of their data governance, organisations can significantly mitigate risks associated with data management, enhance data integrity, and maintain a steadfast commitment to regulatory compliance.

Integration with hybrid and multi-cloud strategies

Build-to-suit data centres are built with interoperability in mind, allowing businesses to integrate seamlessly with various cloud platforms and services. This enables enterprises to leverage the best-of-breed solutions from multiple cloud providers while maintaining compatibility and interoperability across their IT ecosystem. Whether it's infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), or software-as-a-service (SaaS), build-to-suit data centres provide the flexibility and agility needed to support diverse IT architectures.

Build-to-suit data centres often feature robust networking capabilities, including high-speed interconnects and redundant connectivity options. This allows organisations to establish seamless connections between their on-premises infrastructure, private cloud environments, and public

cloud providers. Organizations can ensure low-latency access and high-bandwidth connectivity across their hybrid and multi-cloud deployments by leveraging dedicated network links and direct connections.

Future-proofing investments

These data centres are built with an eye toward future advancements in technology and infrastructure standards, ensuring that organizations can leverage their infrastructure effectively for years without needing costly upgrades or migrations.

Many enterprises have successfully leveraged build-to-suit data centres to address their data centre dilemmas, showcasing tangible benefits and outcomes.

Unlike traditional data center options, which may have space, power, and cooling limitations, build-to-suit facilities provide the flexibility to design and deploy infrastructure that aligns perfectly with organization's objectives.

Support for technological innovations and sustainability

Integrating edge computing and artificial intelligence (AI) into build-to-suite data centres marks a significant advancement in optimizing operational efficiency, reliability, and performance.

AI implementation within data centres further enhances operations. AI algorithms optimise resource allocation, forecast equipment failures, and boost energy efficiency. Machine learning models analyze equipment behaviour patterns, foresee maintenance needs, and proactively address potential issues, minimising downtime and extending hardware lifespan.

These facilities prioritize environmental sustainability through green energy solutions like solar panels and wind turbines, energy-efficient cooling systems, and innovative server configurations.

Moreover, robust disaster recovery capabilities ensure swift emergency restoration, including backup generators, secondary data storage, and redundant network connections. Advanced monitoring tools pre-emptively identify and resolve potential issues, ensuring continuous uptime and operational stability.

The key considerations

According to Surajit Chatterjee, Managing Director, Data Centres India, CapitaLand Investment, a thorough analysis of the return on investment (ROI) and long-term value proposition of build-to-suit data centres is essential for decision-making. Businesses must assess the total cost of ownership (TCO), which encompasses the initial capital expenditure and ongoing operational expenses over the data centre's lifecycle. By comparing TCO with potential savings and revenue generation opportunities, organizations can determine the financial viability of investing in build-to-suit infrastructure.

Operational efficiency is another crucial consideration. Build-to-suit data centres are designed to optimize resource utilization, streamline processes, and enhance overall operational efficiency. Factors such as energy efficiency, scalability, and flexibility contribute to reducing operational costs and improving productivity. Businesses can better understand its impact on their bottom line by analysing the potential efficiency gains and cost savings associated with build-to-suit infrastructure. Furthermore, alignment with strategic business objectives is essential. Build-to-suit data centres should support the organisation's long-term goals, whether expanding market reach, enhancing customer experience, or driving innovation.

In today's rapidly evolving digital landscape, the significance of having a data centre tailored to your business needs cannot be overstated. As enterprises navigate the complexities of the modern digital economy, the one-size-fits-all approach often falls short of meeting businesses' diverse and evolving requirements. Recognizing this challenge, CapitaLand Data Centre (CLDC) offers Build-to-Suit (BTS) data centre services designed to precisely align with each client's unique needs.

CLDC's expertise lies in crafting data centre solutions that are not only tailored but also seamlessly integrated into the fabric of your business operations. Leveraging CapitaLand's extensive global real estate network, CLDC ensures that every aspect of your data centre, from its location to its infrastructure, is meticulously curated to meet your specific requirements.

With CLDC's BTS data centre services, businesses can rest assured that their needs are in capable hands. Our commitment to excellence and unparalleled industry expertise make us the ideal partner for companies looking to thrive in the digital age. So why settle for a one-size-fits-all solution when you can have a tailor-made data centre for your business? ■

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The trust challenge in the age of AI

So far, there hasn't been a perfect way for AI systems to reach human-level intelligence, which leads to concerns about trusting AI.

By **Jatinder Singh**

ChatGPT's 2022 debut may redefine web search for Generation Alpha, evolving past the foundations laid by Yahoo! and Google.

Picture a future where your AI buddy is always there, ready to chat, provide guidance, and solve your problems around the clock. You trust the model entirely, just like your friend and a well wisher.

But one day, someone with malicious intentions tricks your AI buddy into creating harmful content by manipulating its data. Despite this, you remain unaware and continue to trust your AI buddy. Sounds unsettling, doesn't it? It could potentially do more harm than good. But this is the direction we are heading!

There is little doubt that AI is swiftly changing the way we work and impacting how organizations function. While it undoubtedly adds the necessary element of intelligence to automate processes, improve productivity, and assist organizations in innovating and generating new revenue streams, it also risks undermining trust. This significant concern could potentially threaten the future.

To date, there has yet to be a foolproof mechanism that could enable AI systems to match the intelligence of human beings. Take, for example, driverless cars, which are touted as the next breakthrough in the era of AI. Instances worldwide have shown AI-enabled automated cars repeatedly failing to navigate situations adeptly without human intervention. One notable incident involved a GM Cruise self-driving car in the US, which collided with a pedestrian who had already been struck by another vehicle, prompting the suspension of its autonomous operations and ensuing legal actions.

According to a recent IBM report titled "Building trust in AI," which draws insights from conversations with 30 AI scientists and thought leaders, establishing trust in AI necessitates substantial efforts to imbue it with moral sensibilities, operate with complete transparency, and offer education about the opportunities it presents for both businesses and consumers. They emphasize that this endeavor must be a collaborative effort spanning scientific disciplines, industries, and governmental bodies.

Moreover, another challenge emerges with the advent of Generative AI. Traditional approaches to AI development are now supplemented by this new form, introducing further complexities. If the launch of Yahoo! in 1994 and Google in 1998 made information search on the web easy and universally accessible, the launch of ChatGPT in November 2022 opened up an altogether new way of accessing information, and in the years to come, it may cause Generation Alpha to almost forget what web search was all about. This change is inevitable and enhances intuitiveness.

But that's not the real problem! The real challenge lies in whether these new LLM models will build the trust that conventional search engines might have earned over the decades. Fake information and misinformation are one of the biggest concerns growing with AI-generated content. As threat actors continue to evolve and gain the ability to create text that mimics human writing, it becomes a monumental task for organizations to ensure that the LLMs they have deployed are fair, transparent, and ethically sound for building trust among users.

In addition to the above, the proliferation of manipulation and deepfakes makes it extremely difficult to discern fiction from reality. While establishing clear guidelines and regulations around the use of AI, particularly in sensitive areas like healthcare and finance, is essential for fostering trust among users and stakeholders, AI as a technology is outpacing the legal and regulatory framework and, hence, requires constant evolution.

"One of the significant challenges for generative AI is its struggle to replicate the human touch or empathy," noted Prof. Toby Walsh in a discussion with CIO&Leader. This aspect distinguishes human-to-human interactions from machine-to-human engagements, presenting both a challenge and untapped potential.

"The future is unpredictable," remarked Dr. Pavan Duggal, a leading advocate in cyberlaw. "While AI has pushed the boundaries of innovation and productivity, the absence of appropriate policies and governance models could lead to numerous challenges and legal issues that erode trust," he emphasized in a recent interaction with CIO&L.

As experts and governments debate what trustworthy AI should encompass, achieving a global consensus still needs to be achieved. However, as the next generation increasingly relies on AI for daily tasks, we stand on the threshold of an AI-driven era similar to digital transformation. It is imperative that we proactively address associated challenges and establish trustworthy models before this era entirely unfolds. ■

India's IT Leaders Set to Increase AI Investments in 2024

The annual survey conducted by CIO&L reveals that 68% of enterprises plan to boost AI investments in 2024, despite facing skill shortages and security challenges.

By **CIO&L - IT Next Research**

In the ever-evolving landscape of Indian enterprise tech, the shift to digital has become a top priority. The impetus for this transformation gained momentum during the pandemic as businesses adapted to new ways of operating. In the post-disruption era, businesses are strategically adopting innovative tools and tech to enhance engagement, productivity, and customer satisfaction.

Our cover story for January 2024 is based on the CIO&Leader research report, 'State of Enterprise IT in India'. It explores the enterprise technology landscape. With insights from over 300 IT decision-makers, it is a valuable barometer of the technology trends shaping Indian organizations. From Cloud Infrastructure and Security to Data Analytics and Artificial Intelligence (AI), our research, conducted between July and September 2023, provides a 360-degree view of technology deployment, challenges, and future plans.

The report explores everything—from the impact of AI to the enduring use of on-premise solutions, despite the clamor for the cloud. Key takeaways highlight a consensus on the importance of AI but reveal a readiness gap. Cloud strategies continue to be impacted by security concerns and skill shortages.

More than just data, our report mirrors the dreams and challenges of Indian enterprises in the digital age. It aims to forecast the trajectory of Indian enterprise IT, drawing insights from top CIOs and CTOs of leading businesses. It sheds light on how organizations are leveraging cutting-edge technologies to drive innovation, enhance operational efficiency, and remain competitive. Specifically, the report provides insights into the adoption of Cloud solutions, the state of security in organizations, the utilization of data and analytics, and the integration of AI to impact business outcomes.

By highlighting the key insights gathered from IT decision-makers, the report offers actionable intelligence to businesses, technology providers, policymakers, and other stakeholders. The insights will enable a better understanding of the current IT landscape, identify opportunities, and address challenges in adopting and implementing specific technologies.

Key takeaways highlight a consensus on the importance of AI but reveal a readiness gap. Cloud strategies continue to be impacted by security concerns and skill shortages.

The insights gleaned from the minds that shape and steer IT strategies will help businesses make informed choices in the quest for technology-led transformational capabilities. We thank all IT leaders who participated in this research study, patiently answering a series of surveys—and revealing their views, perceptions, and opinions.

INDIAN BUSINESSES GEARING UP FOR AI SPENDING

A standout revelation from the annual CIO&Leader State of Enterprise Technology survey indicates that 68% of Indian enterprises are poised for a significant uptick in AI spending within the next 12 months. The survey underscores that the adaptability of AI is inspiring businesses to delve into various applications within their operational frameworks, fostering a heightened enthusiasm for AI integration.

The surge in AI investment can be attributed to the successful outcomes of pilot projects, with:

- 25% of respondents foresee a substantial rise in spending
- 43% of participants anticipating a moderate increase
- Only 15% of the respondents are undecided about future spending on AI and ML.

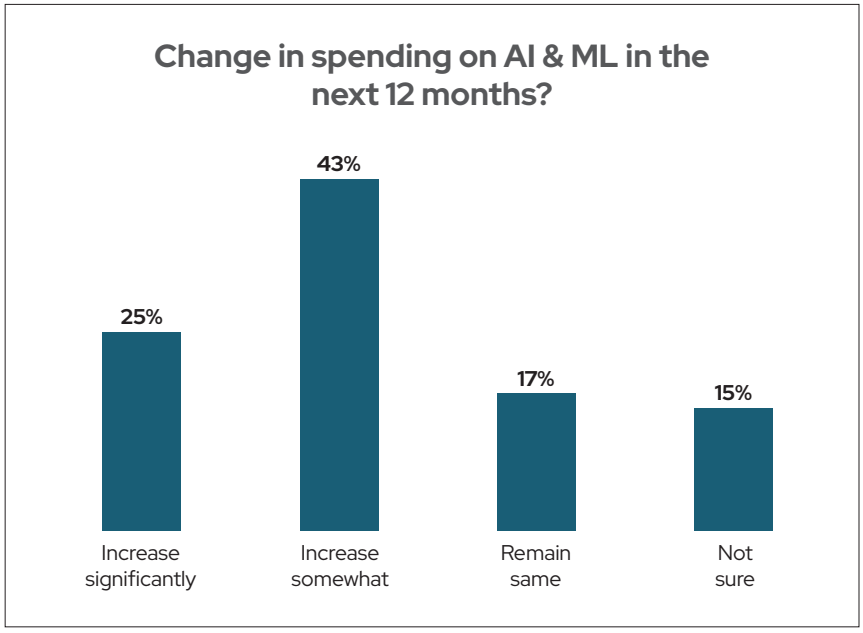
Tech developments key to unlocking potential: The survey underscores the substantial enhancement of AI capabilities, driven by increased availability of data and cloud-enabled processing power. The availability of large volumes of data, multiple AI platforms, cloud-based resources, a growing skill base, and accelerating technological advancements are coming together to lower barriers to trial and adoption.

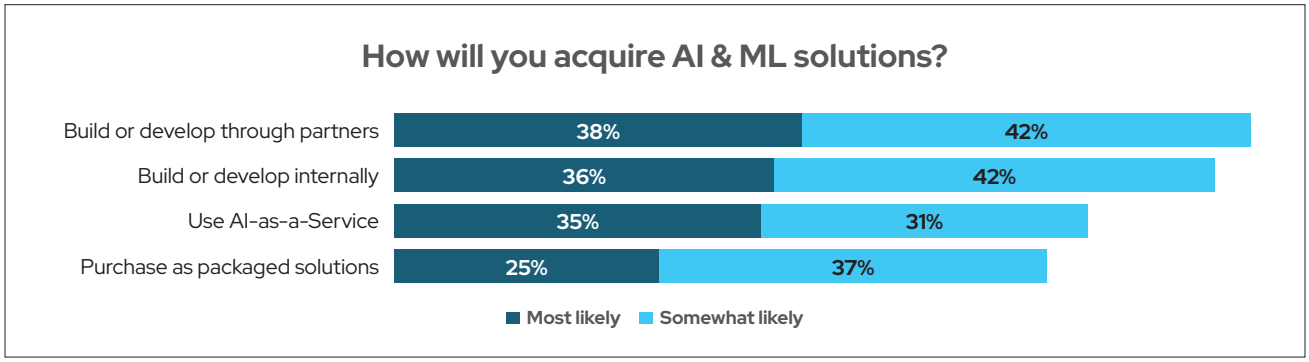
While business functions like IT operations, sales and marketing, and customer service have been quick to leverage the benefits of AI/ML, survey respondents anticipate that supply chain, HR, and finance-related processes also have good potential for using specialized AI/ML solutions.

Traditional R&D processes often involved sifting through massive datasets, which was time-consuming and resource-intensive. With AI/ML learning algorithms can quickly analyze vast amounts of data, identifying patterns, trends, and correlations that human researchers may have missed.

Organizations are seeking effective ways to acquire AI capabilities by employing diverse strategies, including forming partnerships (38%), building internal expertise (36%), and leveraging AI-as-a-Service offerings (35%)

Revolutionizing customer experience: As customers increasingly seek seamless and personalized experiences, AI has become the linchpin of a successful CX strategy. AI empowers companies to better understand customer needs, insights into preferences, and contextual information by analyzing vast amounts of data at speed and scale. Early AI implementations were confined to IT and supply chain management. Having demonstrated its value proposition with greater efficiency and cost savings, AI adoption





has transformed from a niche technology in fringe functions to becoming an integral component of core business applications. Now organizations are more confident that AI adoption can create an impact and use it for competitive advantage. Adoption in core business applications is expected to accelerate with advancements in AI research, natural language understanding, and computer vision.

Businesses are using AI to re-imagine customer engagement strategies (23%) and deliver highly personalized products and services (23%). AI is providing organizations with the tools to understand customer preferences, anticipate needs, offer tailored experiences, and create greater customer loyalty.

Technology, Data, and Compliance are the top challenges: Despite the growing enthusiasm for AI, organizations are struggling to cope with the profusion of choices and the rapid pace of technological evolution.

Embracing AI is throwing up significant challenges, chief amongst which is choosing the right technologies (46%) and identifying suitable use cases (44%). The rapidly evolving landscape of AI technologies is overwhelming organizations and selecting the most suitable AI framework, platform, and tools to align with business needs is turning out to be the most formidable challenge. Determining the right combination of technologies that fit within the existing IT infrastructure and can easily integrate requires an understanding of IT estate and AI technologies.

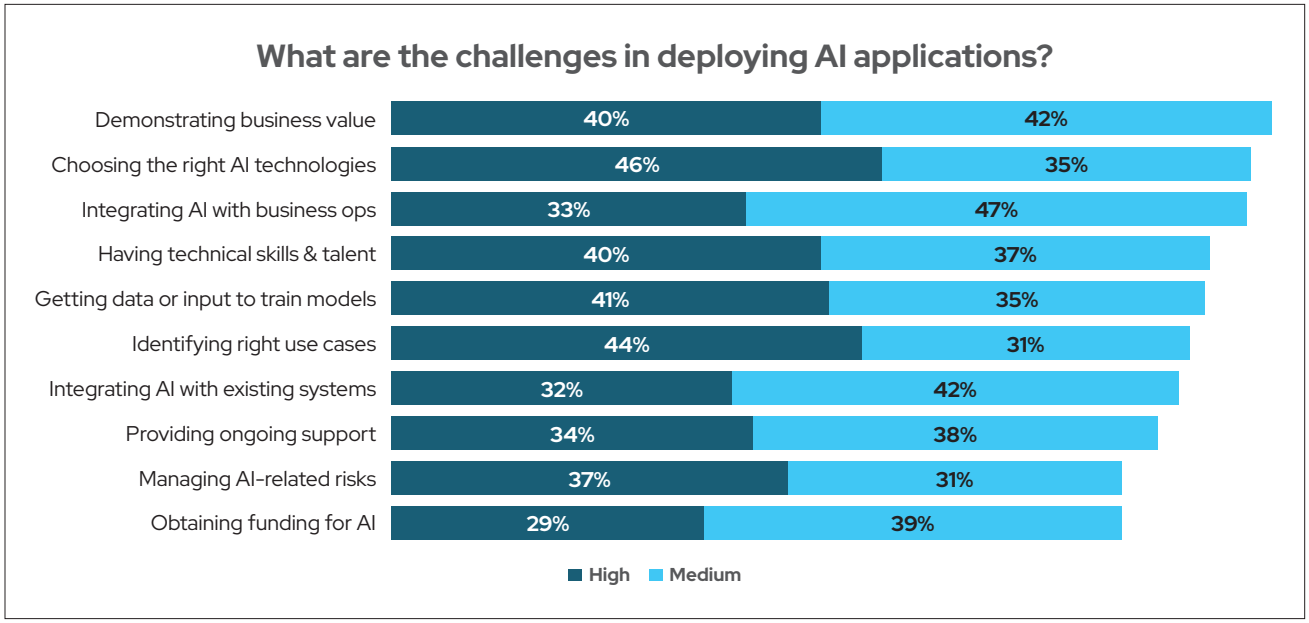
The versatility of AI is prompting businesses to explore diverse applications in the context of business operations, driving growing interest in using AI.

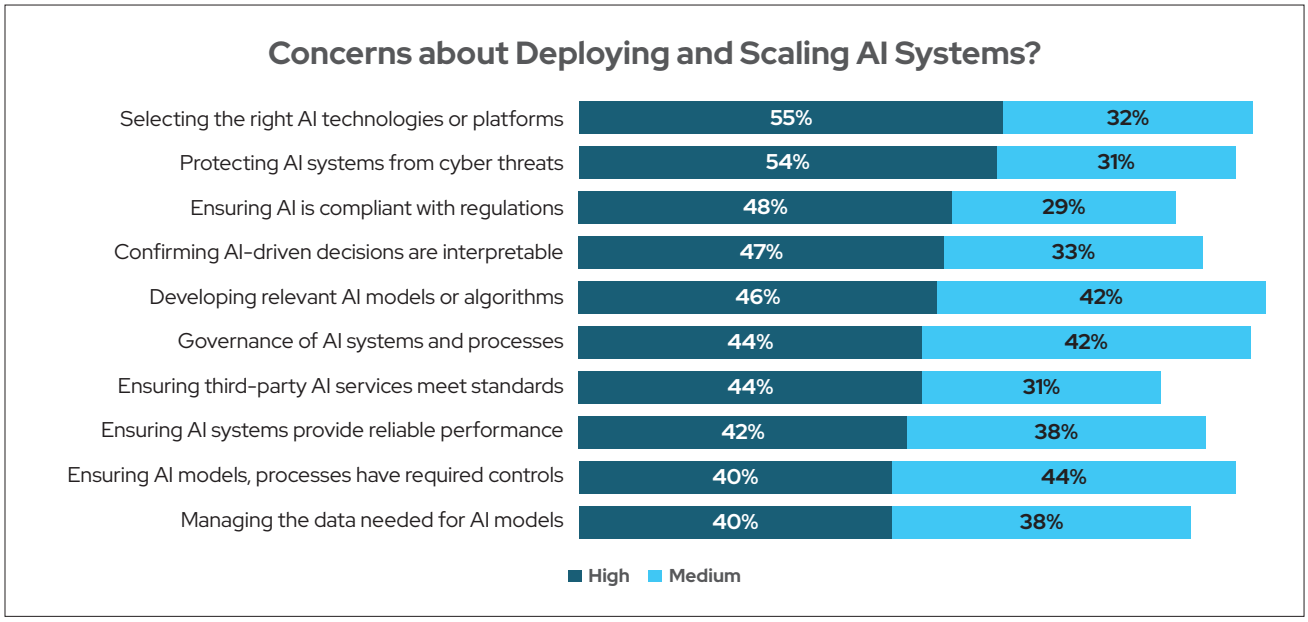
Some organizations struggle to identify the right use cases wherein AI can create meaningful value; enhance existing processes; or create new opportunities. This requires a thorough understanding of business processes, customer needs, and industry trends to pinpoint areas where AI can make an impact

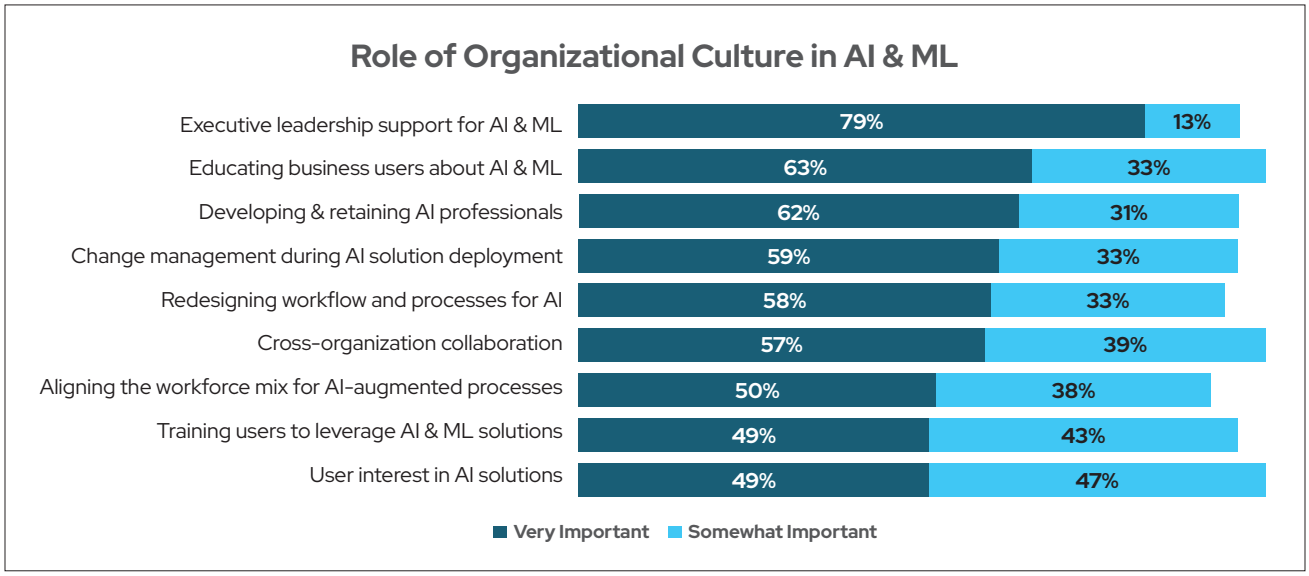
Additionally, 54% of participants are concerned about protecting AI systems from cyber threats, particularly in critical applications. Ensuring AI's compliance with emerging regulatory standards is another significant concern that was highlighted by nearly half of the survey participants.

Leadership support more critical for AI success: Respondents identified leadership support as the the most crucial element for the successful integration of AI/ ML technologies. A strong and supportive leadership team (79%) enables to creation a clear roadmap for AI/ML adoption, defines key performance indicators (KPIs) to measure success, and establishes a framework to evaluate the ROI.

Leaders can identify strategic use cases where AI/ML can have the most







significant impact, prioritizing projects that drive tangible value and competitive advantage. Their involvement helps avoid disjointed and ad-hoc AI/ML implementations and encourages a more cohesive and integrated approach across different business units (57%).

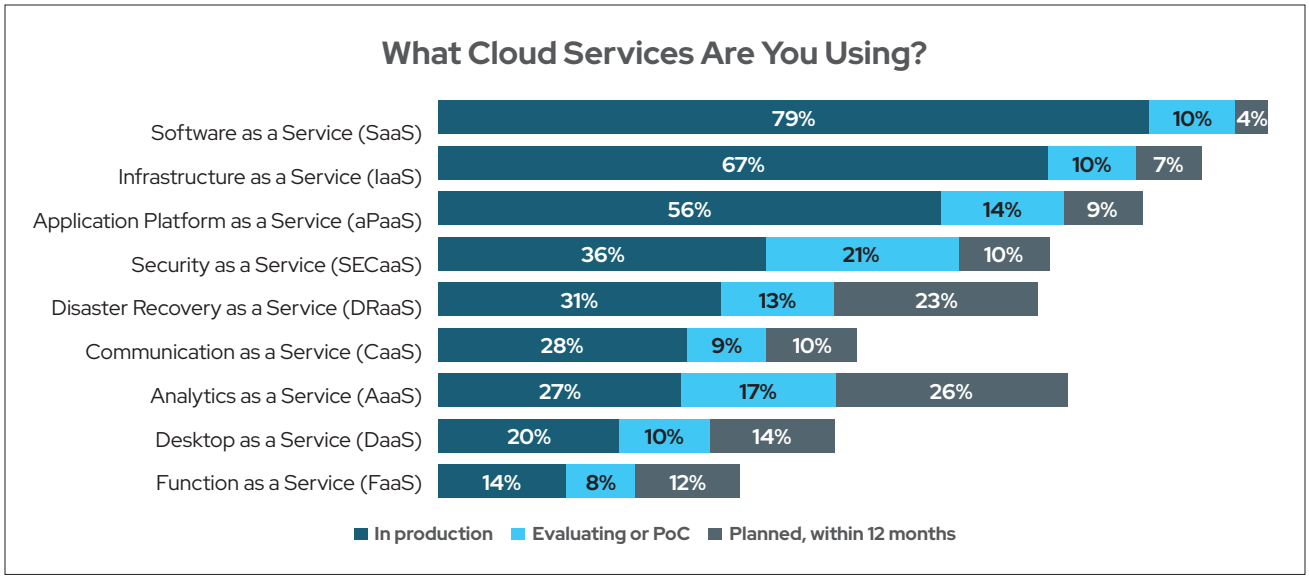
According to the survey findings, educating business users about AI/ML empowers employees to make informed decisions about AI/ML adoption (63%) by dispelling misconceptions and ability to identify suitable AI/ML use cases within their domains to better drive innovation and efficiency while avoiding unrealistic expectations. Crucially, input data from business users helps data scientists and AI experts refine models and tailor solutions to better suit business requirements. Developing and retaining talent is crucial (62%) to provide stability to AI initiatives which will then yield sustainable business impact.

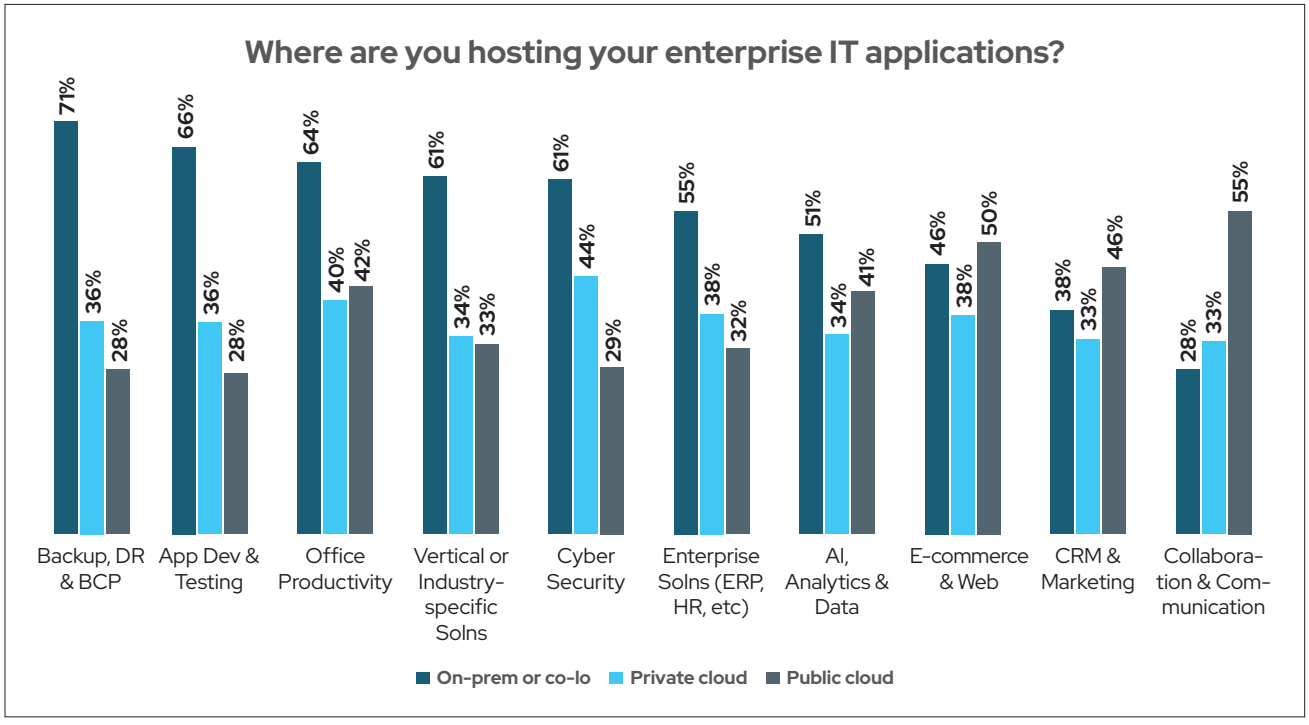
CLOUD ADOPTION CONTINUES TO SURGE

Cloud adoption continues to surge, driven by digital transformation initiatives and the demand for innovation and enhanced customer experiences. Additionally, the imperative to leverage advanced technologies such as AI further fuels the momentum.

Businesses are reaping substantial benefits as Cloud deployments reach higher levels of maturity. This is evident in the wide adoption of cloud-native architectures, containers, and micro-services, implementing DevOps practices, and utilizing APIs to create value.

Overall, the as-a-service model is maturing with adopters using a variety





of services. SaaS is in an advanced stage of adoption.

ITDMs are wary about managing cloud security. Organizations need to adopt a comprehensive approach, combining robust security tools, well-defined policies, regular audits, and staff training to address the unique challenges. Businesses are faced with performance issues and there is an urgent need to optimize application performance.

What Cloud Services India Inc. is using: Indian businesses are using a wide variety of Cloud services from SaaS (79%) at the top end to Function as-a-service (15%) at the other end. Infrastructure-as-service is widely adopted amongst 67% of respondents with another 10% evaluating adoption with PoCs, clearly indicating that the promise of Cloud-native capabilities is luring Indian businesses to migrate workloads. PaaS is witnessing significant adoption in India amongst 56% of the respondents with 14% evaluating it via PoCs. This momentum can be attributed to the presence of mature platforms such as Salesforce, Microsoft SharePoint, Office 360, SAP Business Technology Platform, Zoho.

The proliferation of low-code-no-code platform providers such as ServiceNow, Automation Anywhere, and Kissflow. Security-as-a-service (SECaaS) is popular at 36% which points to the

need for comprehensive security solutions. In addition to getting full-featured security tools, SECaaS allows businesses to overcome skill gaps with remote monitoring, incident management, and remediation of security incidents.

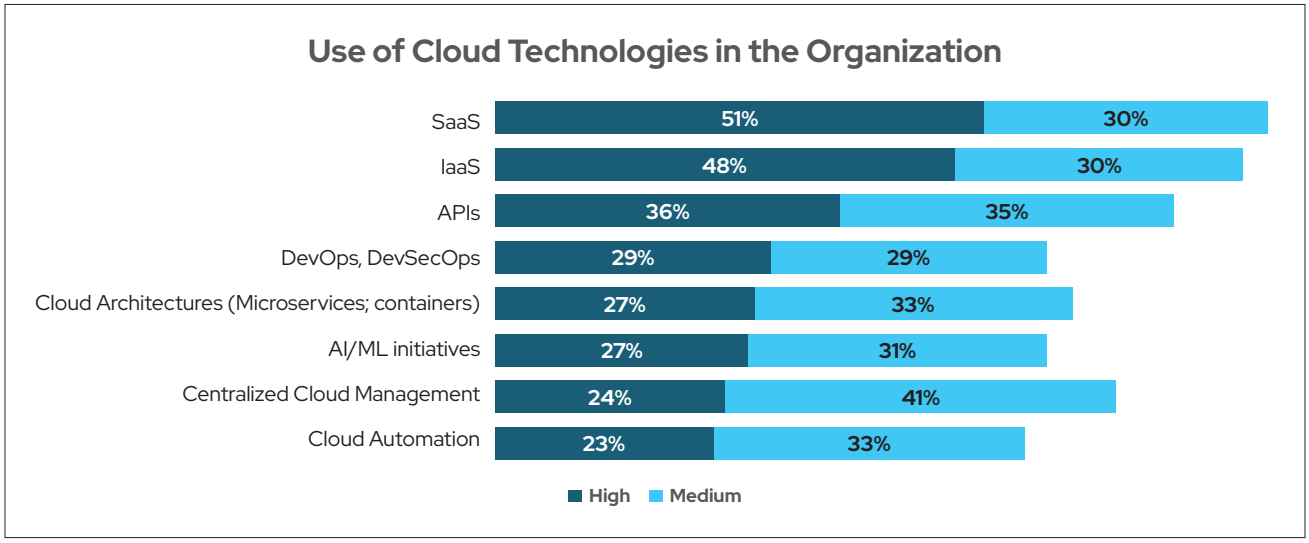
Disaster Recovery-as-a-Service also picking amongst 31% of respondents with another 13% of respondents evaluating it seeking to ensure business continuity in the event of an attack or natural disaster.

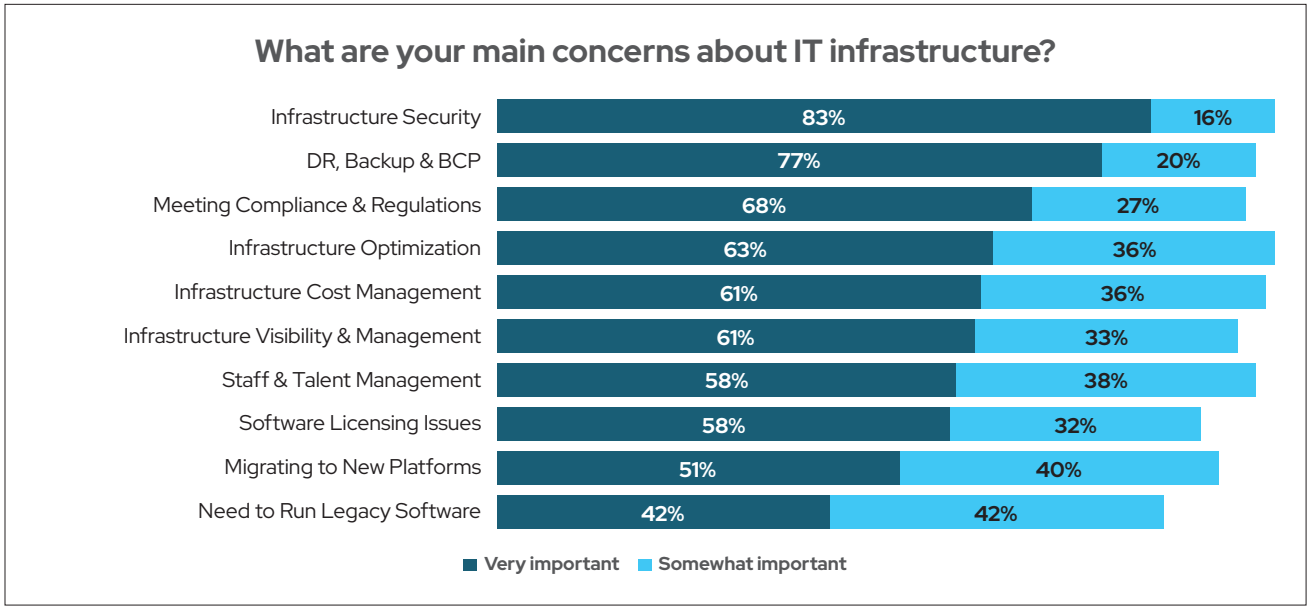
The majority of workloads continue to operate in traditional environments: Despite the growing momentum of cloud technology, the majority of workloads continue to operate in traditional environments and co-location. Public cloud is gaining popularity, but the private cloud remains dominant.

Organizations often leverage the public cloud for periodic capacity access and to manage traffic surges during seasonal peaks. For example, 55% of enterprise applications' workloads (ERP, SCM, HR) are on-prem or in co-lo, 38% in private cloud, and 32% in public cloud. Even in app development and testing, traditionally favored for cloud environments, 66% of respondents still use traditional setups, while 36% opt for public cloud and 28% for private cloud.

Similarly, deployments for disaster recovery, backup, and business continuity planning, ideally suited for the public cloud (28%), are gradually gaining traction, with a significant number of initiatives ongoing in traditional on-premises and co-location environments (71%) and public cloud (36%). Discerning Indian businesses recognize the cloud's value proposition, with the highest number of respondents choosing to host e-commerce applications in the public cloud (50%), followed closely by on-premises solutions at 46%.

What keeps IT awake: The responses to this question are not a surprise and are on expected lines





with infrastructure security by far the most dominant concern amongst 83% of respondents followed by disaster recovery, back up and business continuity amongst 77% of respondents, followed by meeting compliance and regulatory at 69%.

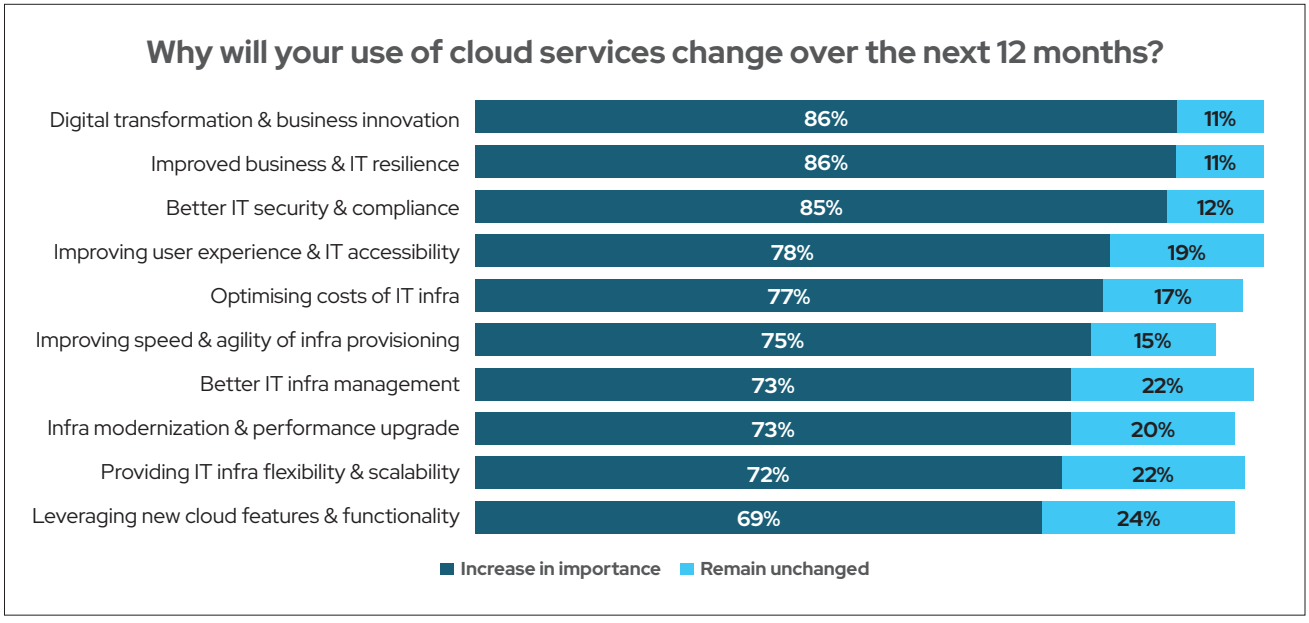
This is a strong indication that keeping the lights on continues to be a major preoccupation for the IT department. Given the surge in the number and sophistication of cyberattacks and the consequent cost of data breaches along with regulatory and compliance challenges, this is not surprising.

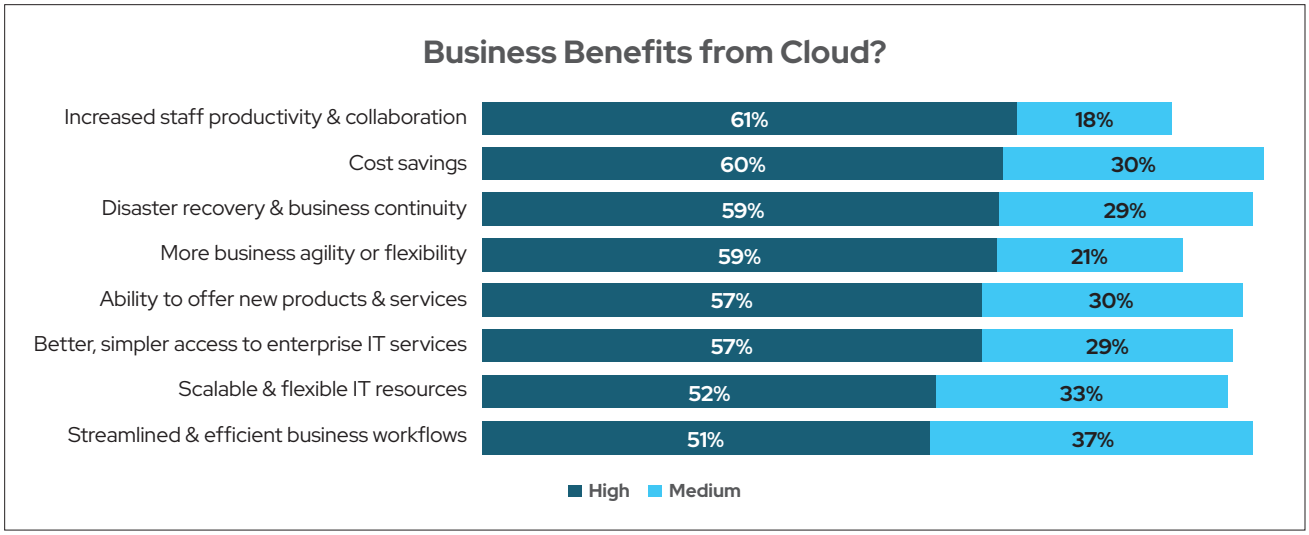
The next set of IT preoccupations relates to cost with infrastructure optimization at 63%; cost management at 62% and infrastructure visibility and management at 72%.

Factors driving cloud adoption: India Inc. has clearly understood the value proposition of the cloud and using it to achieve better strategic outcomes. The top three reasons for cloud adoption in the next 12 months are:

- To drive digital transformation and innovation (86%)
- Better IT security and compliance (85%)
- Improve business and IT resilience (85%)

The need to drive digital transformation is closely reflected in the imperative to deliver a better user experience and IT accessibility (78%) wherein decision-makers in IT perceive the end consumer and internal business as its users. The speed and agility (75%) of the cloud is a lever IT is using to enhance user experience seamlessly. Cloud accessibility makes it easy to experiment and fail fast empowering businesses to innovate frequently, and provide new features and functionalities to enhance user experience. Accessibility also supports infrastructure modernization and upgradation to better application performance (73%). The visibility and flexibility of cloud accords are enabling





businesses to optimize IT infrastructure costs (77%), and better manage the infra (73%).

Indian businesses are reaping the classic benefits of cloud adoption including cost savings (60%); business agility (59%) and leveraging for disaster recovery (59%).

Challenges in using cloud services: Businesses have accurately identified managing cloud security as the top challenge among 88% of respondents. Cloud security is different from the traditional environment as security is a shared responsibility where the CSP is responsible for the physical security of the data center and the underlying infrastructure, while the security of the infrastructure resources and applications must be configured by the customer—the customer decides who has access to which resources.

Several factors make cloud security more challenging. The easy accessibility means individual departments are setting up environments separately, and if the configuring is not secure the entire organization is exposed to data breaches and compliance and regulatory challenges (79%).

Easy accessibility is also creating challenges for ensuring adequate visibility and management for 63% of respondents which is causing a larger challenge of managing the cost of cloud resources for 81% of respondents. Cost management is also due to poor hygiene practices such as leaving unused resources on, underutilized resources, and misalignment of subscription options.

Managing workloads across cloud providers is less challenging at 48% and scaling across regions and Cloud providers at 61% indicating low adoption of multi-cloud workloads in which managing security could be a key deterrent.

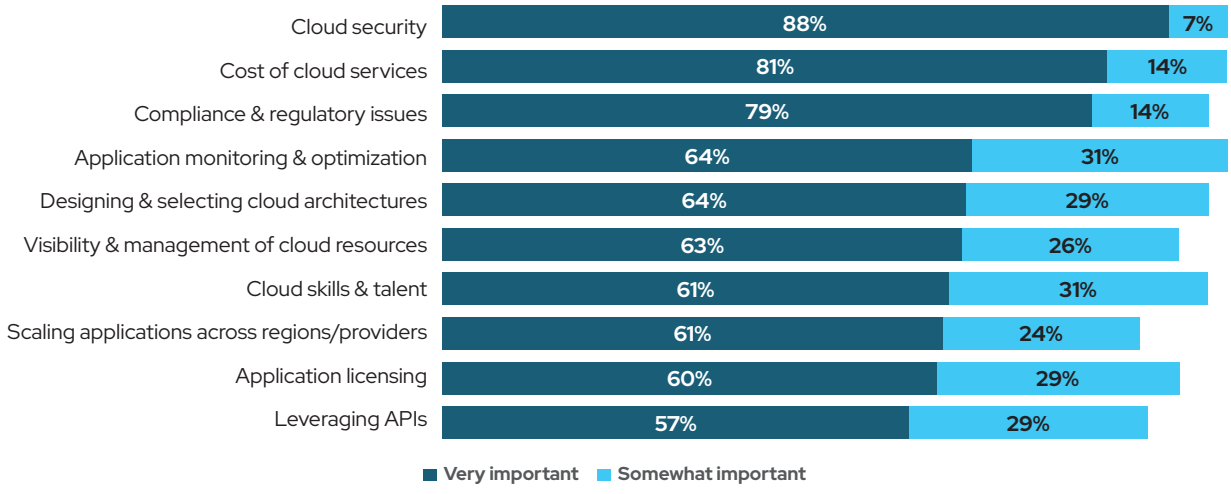
Indian businesses have accumulated a vast quantity of data with a significant number of respondents storing more than 50 PB of hot data which is in active use, across various tiers of storage.

THE DATA EXPLOSION

Data analytics is emerging as a transformative force driving innovation and growth across sectors in India. There is an explosion of data triggered by digitalization, the proliferation of smart devices, social media engagements, e-commerce activities, and IoT deployment. According to the survey findings, Indian businesses have accumulated a vast quantity of data with a significant number of respondents storing more than 50 PB of hot data which is in active use, across various tiers of storage.

This is a huge volume of data, and to put it into perspective, 50 PB data is approximately 25,000 billion pages of printed text or 10 million minutes of uncompressed 4K Ultra HD video!

What are your main concerns about IT infrastructure?

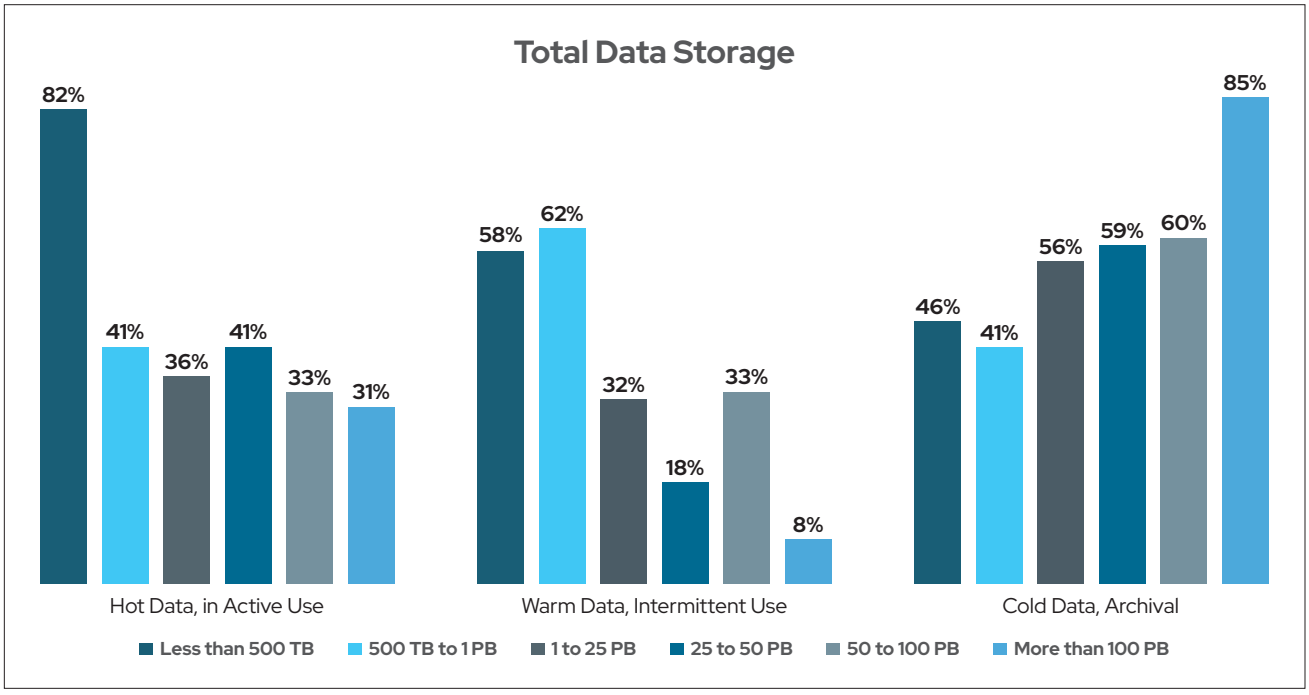


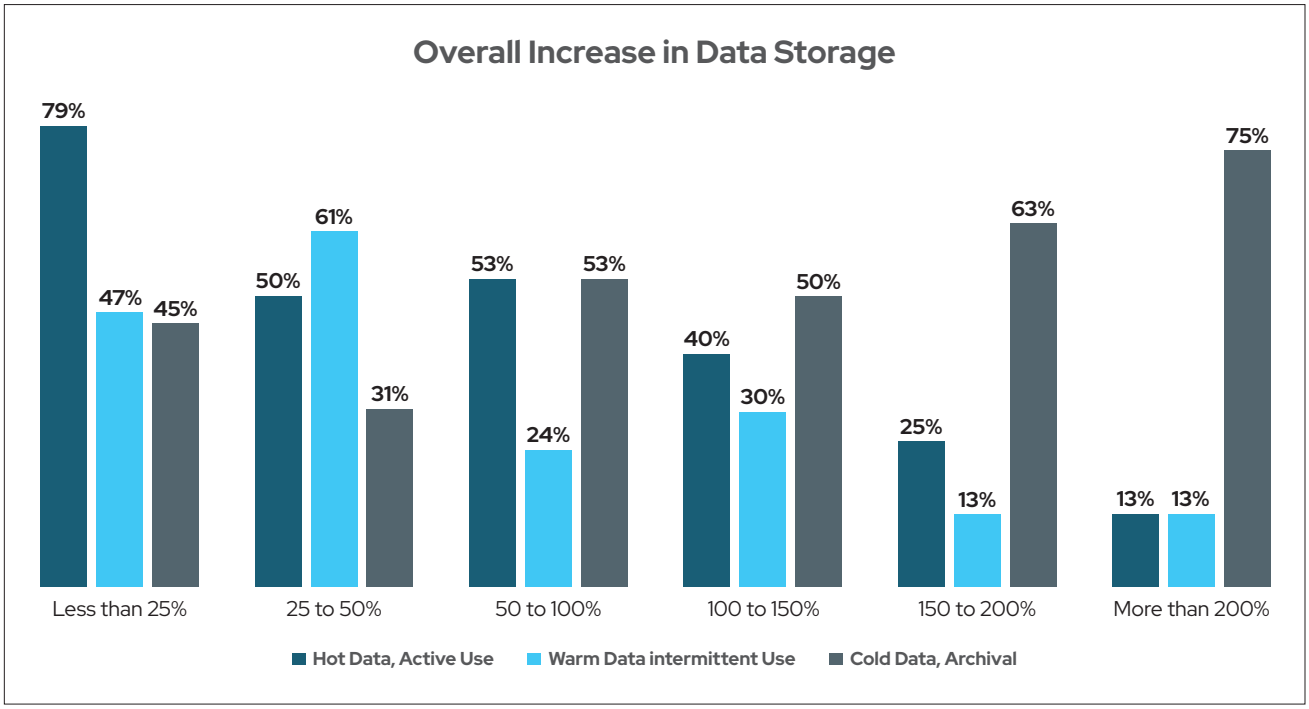
The government's Digital India initiative to provide e-services to citizens and the launch of the 5G network is triggering unprecedented growth in data generation. Public cloud services and the proliferation of data centers in India are making scalable storage capabilities easily accessible at cost-effective rates.

Consequently, data storage is witnessing a huge surge driven by business needs for analytics, AI initiatives, and compliance and regulatory requirements. This is validated in the survey findings where organizations are archiving copious amounts of data to meet regulatory and compliance requirements.

The volume of data across all tiers has increased significantly in the past 12 months. For instance, 53% of respondents stated that the active data increased by 50 to 100% and 61% indicated that the warm data increased by 25 to 50% during the period.

Technological advancements in AI, machine learning, and big data tech-





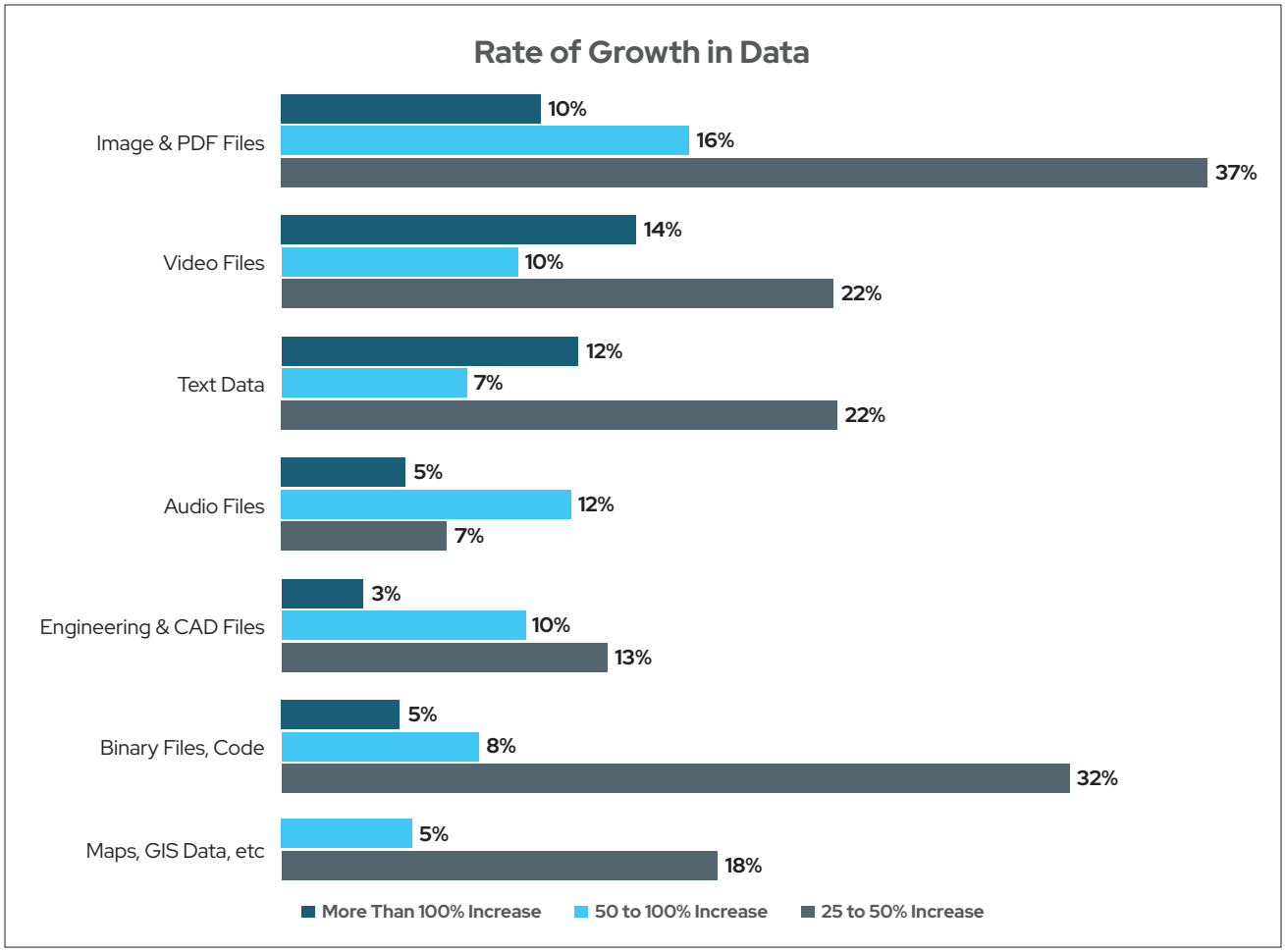
nologies are making data analytics more accessible and impactful. Digital native companies such as fintech, edtech, and e-commerce are using advanced analytics in innovative ways to design new business models; boost fraud detection; and manage infrastructure, logistics, operations, and supply chains.

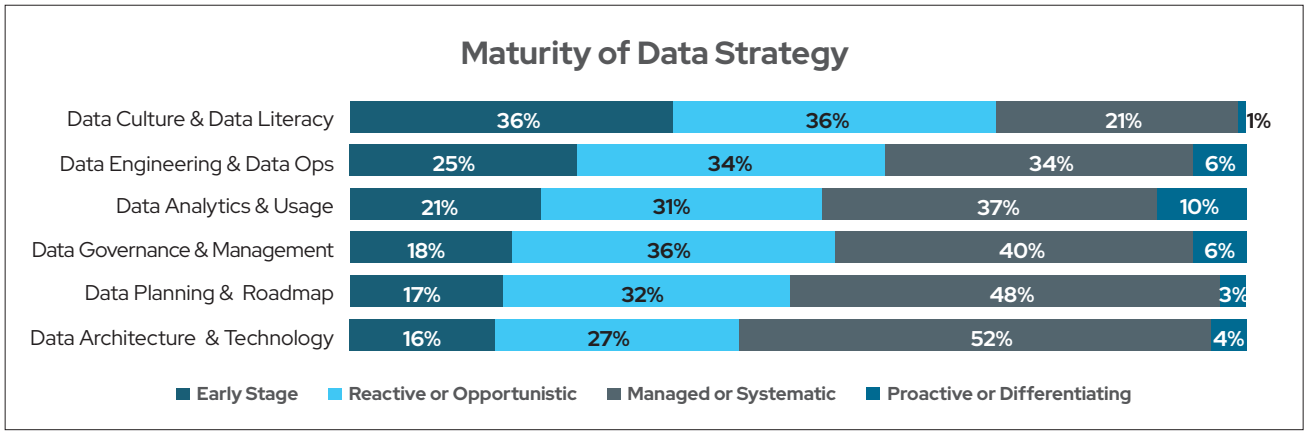
Fintechs are leveraging advanced AI models to offer financial products to the marginalized who do not possess the traditional parameters for risk assessment and creditworthiness. Just as retail and e-commerce companies are offering personalization based on historical data, customer segmentation, and personal preferences.

The survey finds that Indian businesses understand the importance of having a good data architecture and technology infrastructure to meet strategic goals and using a systematic approach to implementation. There is also evidence of advanced data adoption with third-party data integration, data warehousing, and data lakes with pipelines— all of which indicate copious harvesting and mature processing capabilities.

How fast is data increasing? The way we consume and communicate information has undergone a dramatic shift and this is evident in the kind of content enterprises are using and storing. There is a surge in the storage of video with more than 14% of respondents registering more than 100 percent growth. Image and PDF storage have increased by 50 to 100% for around 15% of respondents. Businesses are increasingly using visual media in promotional activities and the rise of e-commerce is directly related to the role of images and videos to influence consumer behavior. Overall, cold data is increasing at a faster rate for most organizations. This indicates an increasingly stringent regulatory environment and the need for organizations to store data for compliance. Also, some industries have an imperative to store customer interaction data.

Maturity of data strategy: There is a high level of maturity in the data strategy of Indian businesses with 52% having a managed and systematic approach with regards to technology and architecture and 48% towards data planning and roadmap indicating the foundations of a robust data strategy are well in place. Businesses have cemented the strong foundations by embracing best practices in data governance and management (40%) with advanced adopters (6%) positioning data management as an opportunity to create a differentiation with high-quality data, and enhanced security





and privacy compliance, all of which foster trust in data-driven initiatives.

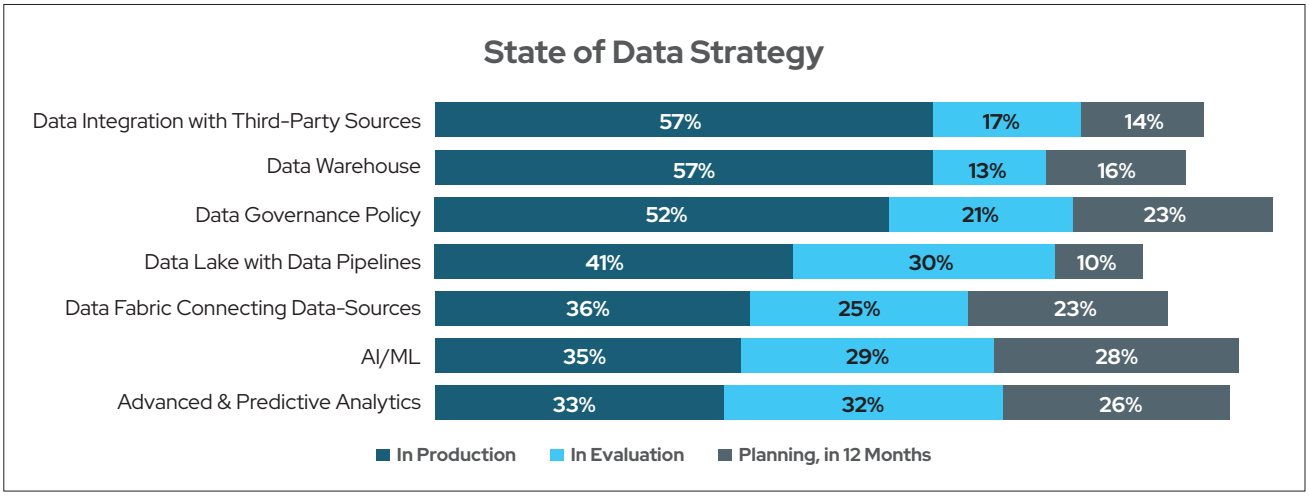
Embracing best practices in data engineering and DataOps (36%) in a proactive manner enables to creation of differentiation (6%). This proactiveness has empowered businesses to use analytics in a systematic manner (37%) for differentiated business impact (10%). A differentiated data strategy leverages data in innovative ways to gain a competitive advantage, drive growth, and deliver value to customers and stakeholders. It calls for prolific data usage wherein insight-driven decision-making is embedded in the organizational culture. This is at the mature stage for 28% of respondents.

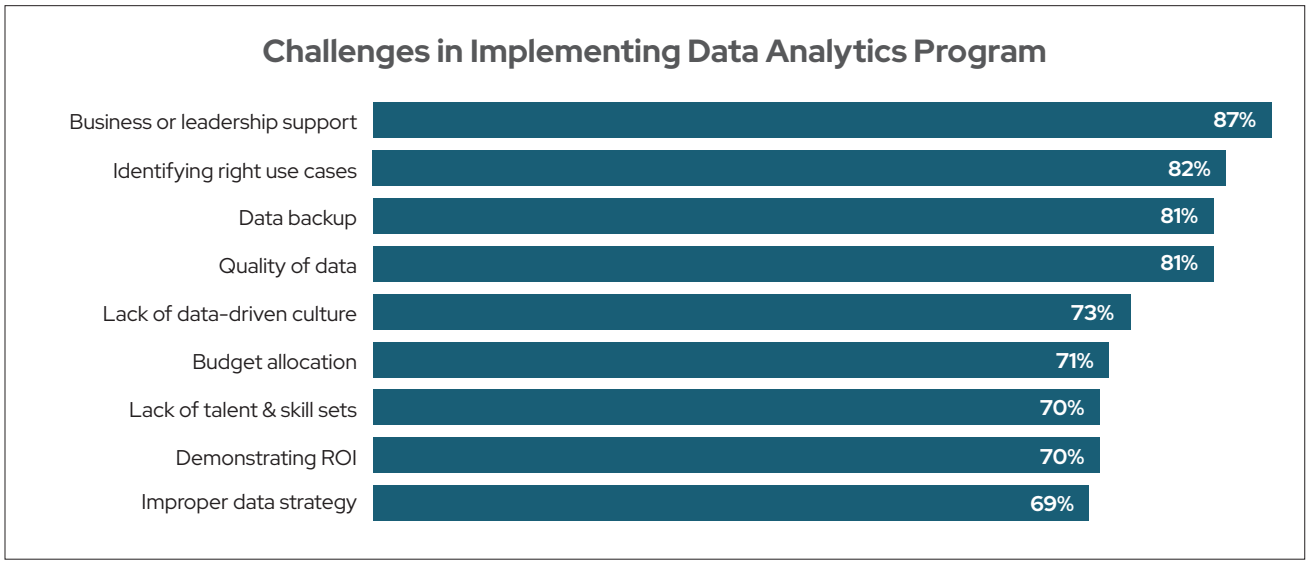
Data strategy trends in Indian companies: In practice, Indian companies demonstrate a high level of maturity in data strategy, with 57% implementing data warehouses and integrating with third-party data sources. This systematic approach to data architecture supports structured querying and analysis. The widespread adoption of data warehouses indicates prolific data usage by business analysts, facilitating AI/ML projects (35%) and advanced analytics (33%). Interestingly, respondents show a preference for AI/ML investments over predictive analytics, possibly considering the latter as a subset. The emergence of data lakes with data pipelines in enterprises reflects a growing focus on harnessing unstructured data.

Challenges in robust data strategy implementation: A significant challenge in implementing a robust data strategy, identified by 87% of respondents, is securing leadership support and business participation. Resistance to changes in data collection, management, and utilization may stem from concerns about workflow disruption or a lack of understanding of the benefits of a data-driven approach.

Establishing a data-driven culture requires leadership backing and active employee involvement at all levels. Overcoming resistance to foster a data-centric mindset can be challenging. Identifying the right use cases (82%) is crucial to showcase benefits and gain support. The quality of data (81%) is vital for decisive action and gaining a competitive advantage.

Data quality directly impacts decision-making effectiveness and the success of new business initiatives. Ensuring good quality data involves sourcing from multiple channels, implementing a governance strategy, and safeguarding data privacy through anonymizing techniques, all requiring meticulous implementation.





SECURING DIGITAL TRANSFORMATION: FOCUS ON EMPLOYEE EDUCATION AND RE-SKILLING

Indian businesses and government organizations face a surge in cyber-attacks, driven by digitalization and hacking for activism, politics, and military objectives.

Phishing, ransomware, and malware attacks are plaguing Indian businesses, causing financial and reputational damage. The evolving threat landscape, ransomware-as-a-service, and a shortage of skilled cybersecurity professionals compound the cybersecurity challenge.

To address these issues, businesses are enhancing education, implementing advanced systems, and deploying monitoring tools. Training and upskilling in-house teams, partnering with service providers, and adopting defense strategies like penetration testing and security audits are becoming common practices.

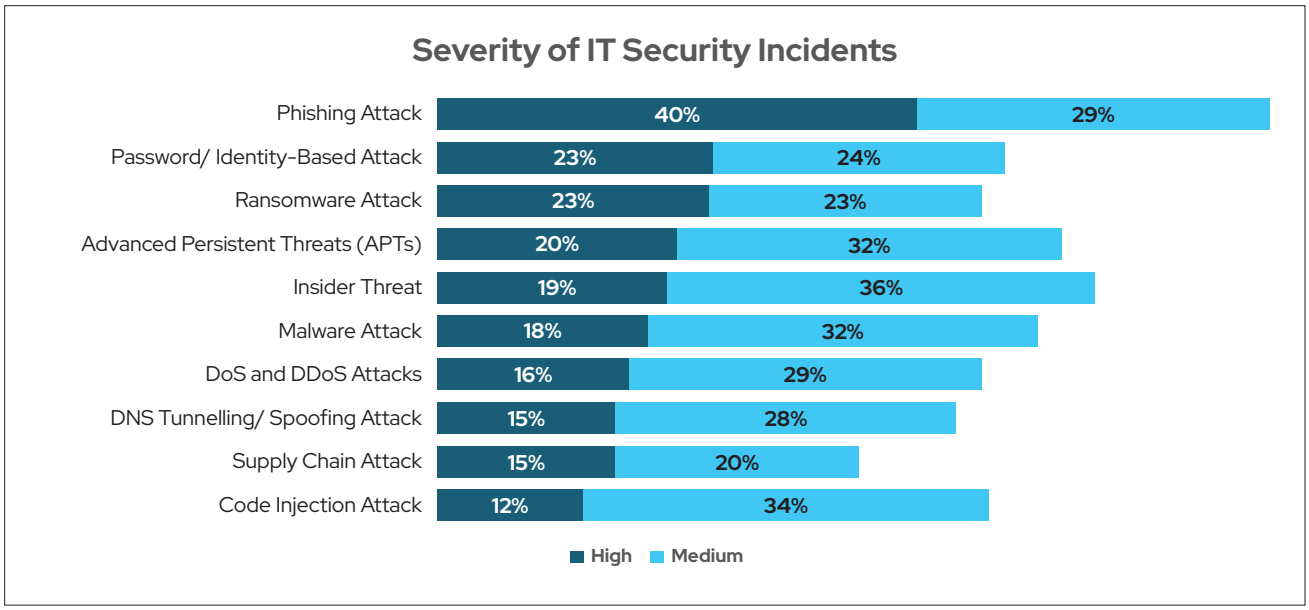
The security fabric is strengthened by embedding security into the organizational culture. Employees play a crucial role, and embracing cloud best practices is key to effective cybersecurity. The shared responsibility in cloud security involves managing access and employing security-by-design architectures, emphasizing a deny-by-default approach as a best practice.

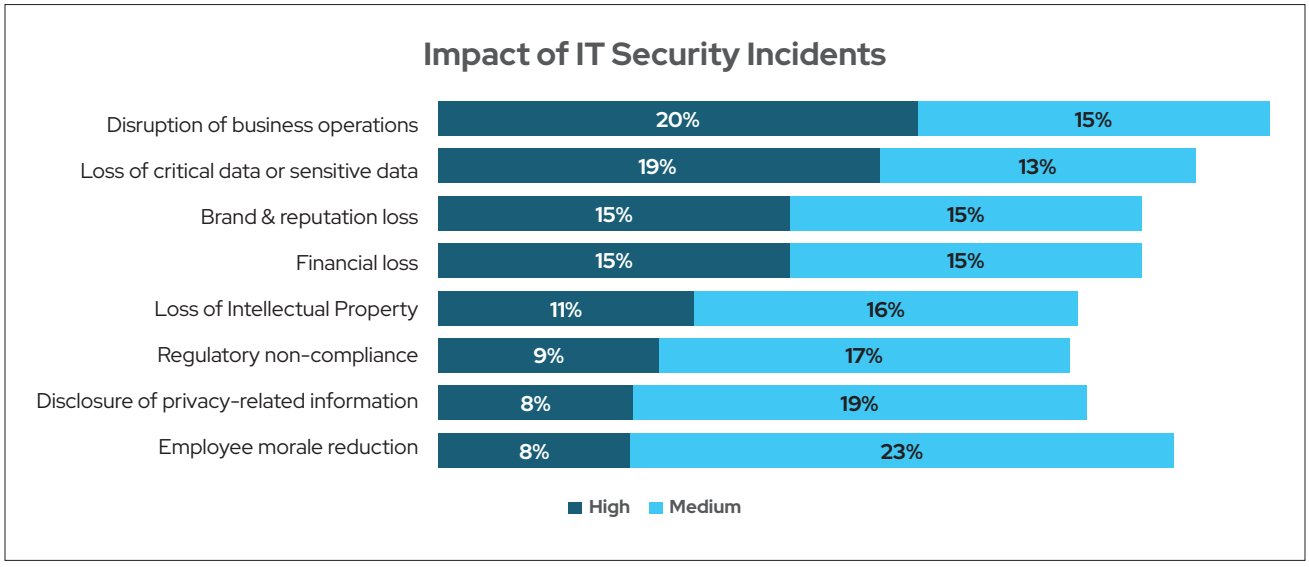
Severity of IT security incidents: According to the survey findings, Phishing has been identified as the most severe form of security incident by 40% of respondents. Ransomware attacks are prevalent but not as rampant. People continue to be the weakest link in the cyber security chain. Hackers employ social engineering tactics to trick employees with innovative techniques that appear genuine and lure them into clicking on malicious links, sharing confidential information, and inadvertently allowing access. Despite training and awareness programs employees continue to walk into traps. About 36% of respondents have attributed insider threats as the cause of security incidents with moderate severity. Careless employees who do not adhere to company policies or bypass company security measures for convenience often cause security breaches.

Sometimes disgruntled employees' resort to malicious activities including stealing or deleting data, selling or exposing data with an intent to harm the organization. Ransomware attacks have been severe among 22% and moderately severe among another 22% of respondents, indicating ransomware is a major source of threat to Indian businesses.

Impact of security incident: The most widespread impact of security breaches includes disruption to business operations (27%); loss of critical/sensitive data (19%); financial loss

There is a surge in the storage of video with more than 14% of respondents registering more than 100 percent growth.





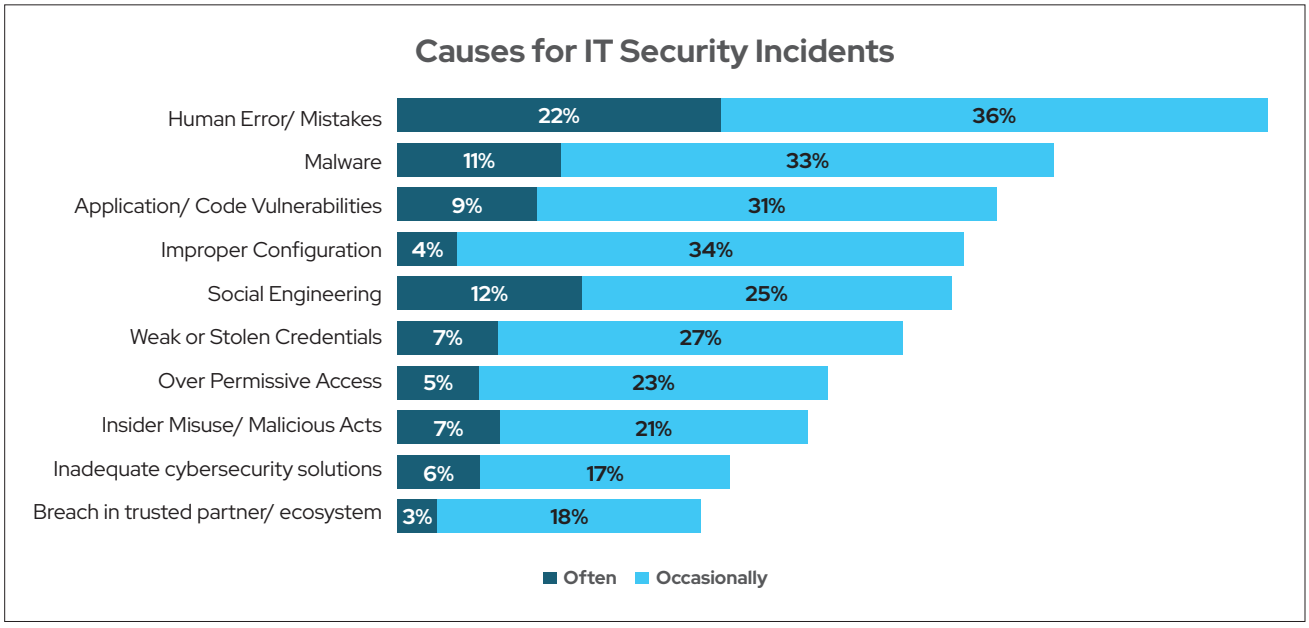
and affecting the brand and reputation (15%). What stands out as a deeper impact of data breach is that it affects the morale of employees (23% have indicated it as an impact with a medium degree). This becomes a red flag because when a setback percolates to employees it has a ripple effect on the efforts and enthusiasm people bring to the workplace including the quality of service to customers.

Root causes of data breaches: The primary causes of data breaches often stem from human vulnerabilities, emphasizing the adage that man is the weakest link in cybersecurity. Despite advanced tools, human error (22%), social engineering leading to employee mistakes (12%), and occasional misconfigurations (34%) remain top contributors.

The lack of skills and understanding of cloud technologies is a significant factor behind human errors and misconfigurations. Unlike traditional settings, where a perimeter-based approach sufficed, the shift to remote work, mobility, and cloud popularity necessitates modern security management approaches.

In the context of cloud security, a shared responsibility model emerges. Customers are tasked with configuring access to resources, while the cloud provider ensures the physical security of the data center, along with the underlying networking and infrastructure resources.

Key IT security challenges: The foremost challenge in cloud security, identified by 32% of respondents, is the dependence on platform providers. Organizations face difficulties in maintaining control and visibility into underlying measures and configura-



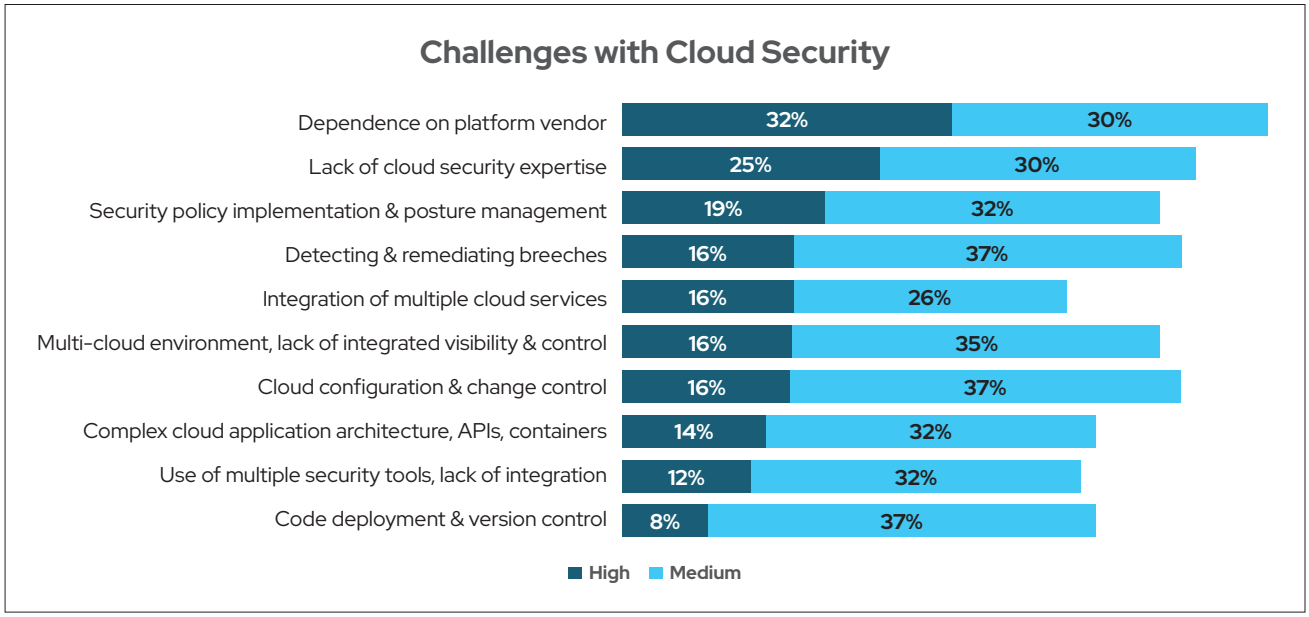
tions, limiting their ability to implement customized security controls aligned with specific requirements and industry regulations.

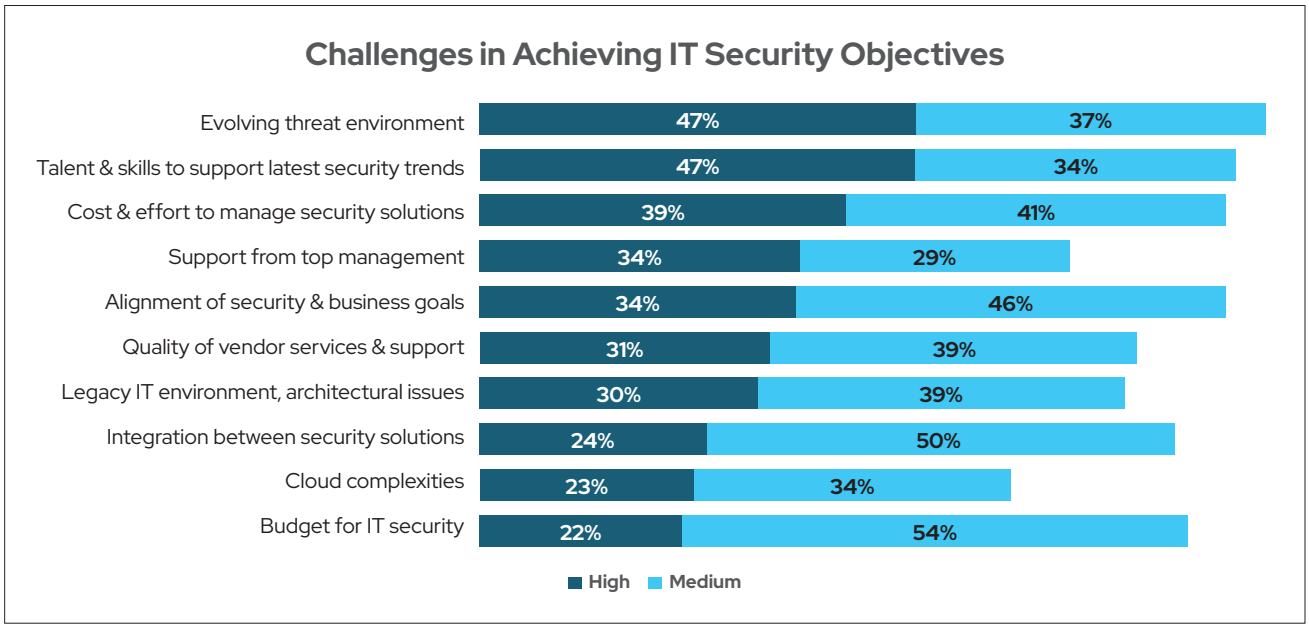
A shortage of cloud security experts (25%) compounds challenges in implementing policies, defining security postures (19%), and handling multi-cloud integration (16%) and configuration (16%).

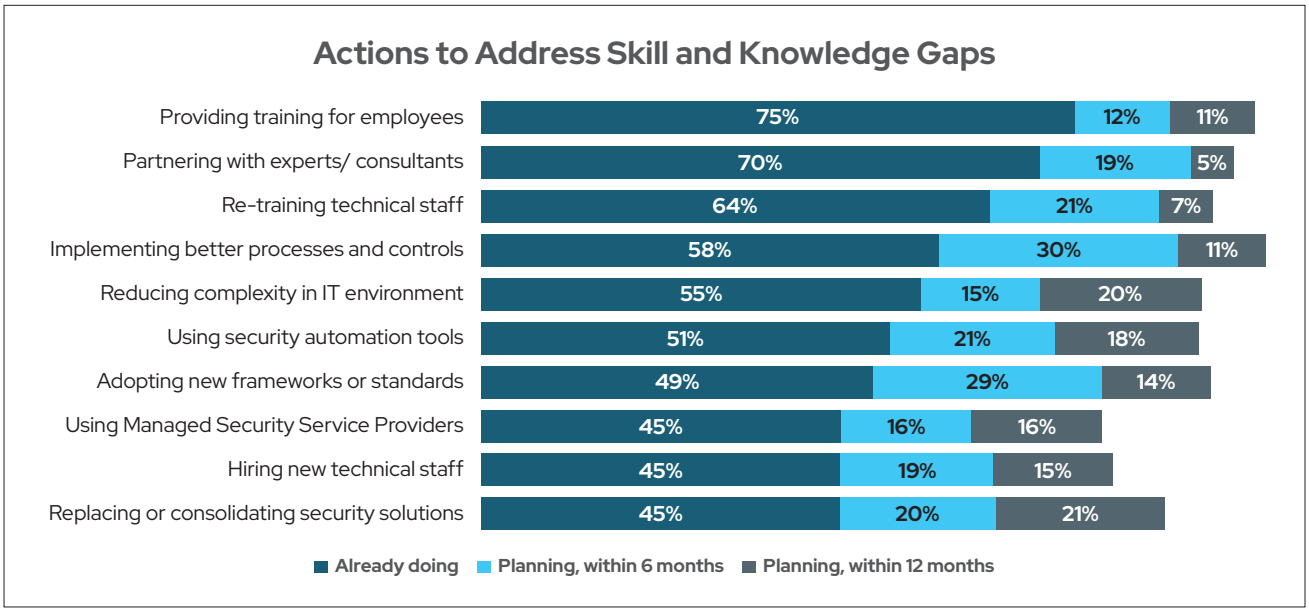
Adding complexity, cloud vendors offer diverse security tools with variations in functionality, ease of use, and integration capabilities. This poses a challenge for organizations utilizing multiple cloud vendors, making it difficult to implement consistent security policies, centralized threat monitoring, and efficient access and controls across systems.

Key hurdles in achieving IT Security: Achieving robust IT security for organizations faces challenges primarily driven by the rapidly evolving threat landscape (47%) and a shortage of skilled professionals (47%). Organizations struggle to keep pace with threat actors employing innovative social engineering, zero-day exploits, and malicious techniques, leading to a rise in sophisticated cyber-attacks, including the widespread use of ransomware-as-a-service.

The resulting complexities increase the cost and effort required to manage security (39%), placing additional pressure on security teams already grappling with budget constraints (54%). The significant implications of costs







and budgets highlight the need for continuous investments in capabilities, including training, talent acquisition, and partnerships, to stay abreast of evolving technologies, attack techniques, and defense strategies.

A misalignment between security and business goals (34%) exacerbates challenges, as organizations may prioritize short-term financial goals, compromising resource allocation for cybersecurity. This often leads to managing outdated security infrastructure and hesitancy to invest in capability building.

Organizations embrace training, partnerships, and automation to bolster Cybersecurity: A majority of organizations (70%) are investing in employee training programs to fortify their first line of defense. These initiatives focus on creating awareness about strong passwords, phishing, secure browsing, and social engineering tactics, fostering a shared responsibility for security and reducing the risk of human error.

Recognizing the global shortfall of 3.4 million cybersecurity experts, organizations (64%) are re-training technical staff to address the skill gap. To cope with the growing demand, 70% of organizations are partnering with external experts to bridge the cybersecurity talent gap.

Additionally, organizations are streamlining internal systems and processes (58%) to enhance security, with a significant number (30%) prioritizing this in the next six months. Automation tools (21%) are being incorporated to add an extra layer of defense, actively monitoring and preventing threats in the immediate future. ■

Building Personal Connections and Fostering Trust are the Cornerstone for Leadership

Abhijit Chakravarty, SVP of Core Networks & Security Operations at HDFC Bank, shares his journey from electronic communication to leading digital transformation.

By **Nisha Sharma**

Here are the excerpts from our recent interaction with Abhijit Chakravarty, whose distinguished tenure as the Senior Vice President of Core Networks & Security Operations of HDFC Bank has been characterized by remarkable achievements and groundbreaking innovations.

The journey of a tech visionary

Abhijit's career spans an impressive 29 years, beginning when emails and faxes were considered groundbreaking technologies. Reflecting on his early days, he notes, "It's been a remarkable journey, from supporting electronic fax systems to leading network and security at HDFC Bank. The evolution from dial-up connections to today's sophisticated networks illustrates the transformative power of connectivity."

Navigating challenges with customer-centric solutions

A significant challenge in Abhijit's career has been understanding and catering to diverse customer needs. Drawing on his experiences at Airtel, he highlights the importance of customizing solutions to fit various requirements. "Identifying and catering to those unique needs was both a challenge and a learning curve. It's like making parathas; not everyone prefers the same filling."

"Every customer's needs are unique, much like their preference for parathas. Tailoring our solutions to meet those needs has been key to our success." – Abhijit.

Building strategic partnerships

When it comes to vendor management, Abhijit emphasizes the distinction between vendors and partners. "For long-term technology strategies, you need a partner who's willing to invest in your success," he explains. This approach ensures shared commitment and alignment with business outcomes, fostering long-term strategic partnerships.

Proudest achievements in IT leadership

Among his proudest achievements, Abhijit cites the large-scale implementation of SD-WAN at Axis Bank and the early adoption of collaboration technologies. These initiatives set new standards within the banking industry and prepared HDFC Bank for digital transformation challenges, especially evident during the pandemic.

Leading high-performing IT teams

"Personal connection and trust are paramount," Abhijit states, discussing his philosophy on team leadership. Knowing each team member's aspirations and challenges helps build a cohesive unit, motivating them to deliver without micromanaging every step.

"Trust and personal connection form the cornerstone of a high-performing team. It's about empowering each member while steering them towards our common goals." – Abhijit.

The fascination with space technology

When asked about the technological advancements that have amazed him the most, Abhijit expresses his admiration for space technology. "The level of accuracy and collaboration needed is a testament to human ingenuity and the boundless possibilities of technology," he marvels, showcasing his appreciation for the field's complexity and innovation.

Abhijit Chakravarty's insights from our conversation highlight the dynamic nature of technology and the visionary leaders who steer its evolution. His journey from the early days of electronic communication to spearheading digital transformation efforts at HDFC Bank is a testament to the innovative spirit that drives the IT industry forward. As we celebrate the past 25 years of leadership, we also look forward to the future innovations that leaders like Abhijit will bring to the IT landscape. ■

From Typewriters to AI: A Tech Guru's 25-Year Journey Through Digital Evolution

In the fast-moving world of technology, **Atanu Pramanic**, COO & VP – IT, RPSG Ventures, sheds light on how businesses have changed because of tech advancements.

By **Nisha Sharma**

Over the past 25 years, technology has moved at an incredible pace. This change has transformed not just how companies work but also the role of CIOs.

In a candid conversation with CIO&Leader, Atanu Atanu Pramanic, COO & VP – IT, RPSG Ventures, with decades of experience, shares his journey through the evolving landscape of technology. Starting from the early days of his career to the current era dominated by artificial intelligence (AI), his story offers a unique perspective on how technology has transformed the workplace and the world.

Early beginnings and the digital dawn

Atanu's career began in an era when computers were a rarity, guarded like treasures within his university's mechanical engineering department. "Back then, getting a couple of hours on a computer was considered a privilege," he recalls, reflecting on a time without personal email, relying instead on face-to-face communication and physical documents. These were the days of electronic typewriters, a far cry from today's digital tools.

The Dot-com era and ERP systems

The late '90s brought the dot-com boom and the introduction of Enterprise Resource Planning (ERP) systems, such as Oracle and SAP. Atanu notes the value of ERP knowledge during this time, which marked his transition from mechanical engineering to becoming an IT expert. "Those who understood ERP were the hotcakes in the market," Atanu observes, highlighting a period crucial for tech professionals, setting the stage for the digital transformations to follow.

The rise of the Internet, SaaS, and Cloud Computing

With the 2000s came the widespread adoption of the internet, alongside the emergence of Software as a Service (SaaS) and cloud computing. "Oracle's attempt to merge traditional ERP systems with cloud technology signaled a new chapter in digital solutions," Atanu points out. His career evolved in tandem, focusing on application development, business process management, and, ultimately, leading digitalization initiatives as a CIO.

Digitalization and the importance of security

Reflecting on the shift towards digital technologies, Atanu emphasizes the reimplementation of ERPs and the adoption of digital tools. "The digital landscape has transformed drastically, with security becoming a cornerstone of technological evolution," he explains.

Managing workforce transitions

One of the most significant challenges Atanu faced was guiding teams through the uncertainties of automation and AI. He stresses the importance of viewing technology as an enabler, not a replacement. "Empowering employees to embrace change rather than fear it has been key to our success," he shares, outlining strategies for building confidence among employees wary of change. By focusing on education and the benefits of technology, he has successfully navigated the complexities of modernization.

The future of AI and intelligent enterprises

Looking ahead, Atanu contemplates the role of AI in shaping the future of business. "AI's potential for innovation is boundless, yet its ethical use remains a paramount concern," he asserts. While acknowledging the potential for innovation, he also calls for regulatory measures to ensure the ethical use of AI. The conversation touches on the need for a unified standard for AI deployment, highlighting the balance between leveraging technology and safeguarding human interests. ■

Open-source software boosts development but struggles with security and scalability

Arvind S Shetty, Kyndryl Leader- Global Development, CTO org, shared a deeper understanding of how DevSecOps and open source reshape IT organizations' operations, emphasizing the importance of security, scalability, and effective team management in today's rapidly changing technological world.

By **Nisha Sharma**

The role of IT organizations is continually evolving in the changing technology realm, requiring adaptive strategies and forward-thinking approaches. In a conversation with Nisha Sharma, Principal Correspondent at CIO&Leader, Arvind S Shetty, Kyndryl Leader-Global Development, CTO org, provides insights into the complexities of modern IT landscapes. This discussion explores the integration of DevSecOps in software development, the impact of open-source communities, the importance of accessibility in software design, the need for transparency in technological environments, and the management of remote work and distributed teams.

Arvind Shetty's expertise illuminates how these factors affect IT organizations' operation, culture, and success in an era of rapid technological change and significant cybersecurity concerns. His analysis reflects current trends and anticipates the future, offering an overview for IT professionals navigating these changes.

ARVIND S SHETTY
Kyndryl Leader- Global Development, CTO org

With the current prominence of Dev SEC OPS in many IT organizations, how do you see its immediate impact on the software development lifecycle, especially regarding security integrations?

Arvind Shetty: Software development has evolved significantly, transitioning from the traditional waterfall model to more dynamic methodologies. Initially, the waterfall model focused on a linear approach: build, test, then deploy. This method often delayed quality assessment until the later stages of the development cycle.

The introduction of Agile methodology marked a significant shift. Agile allows for incremental development and continuous feedback, enabling teams to demonstrate value and functionality regularly. This approach transformed development into a more flexible process, accommodating various coding styles and solutions.

Following Agile, the adoption of DevOps practices further refined development. DevOps emphasizes continuous code integration from all developers, fostering collaboration and early detection of integration issues. This shift moved quality assurance from later stages to earlier in the development cycle, enhancing overall quality.

Security considerations led to the emergence of DevSecOps. This approach integrates security practices from the beginning of the development process, ensuring secure coding and standardization of security measures. It also automates testing and focuses on proactively addressing cybersecurity threats.

Despite these advancements, challenges remain, particularly in standardizing DevSecOps practices across

different development teams within an organization. Each team may develop its own DevSecOps pipeline, creating potential integration issues at the broader organizational level. Thus, understanding and implementing standard practices, tools, and assets essential for effective DevSecOps is crucial.

In this context, the focus is on managing and optimizing development pipelines across organizations. This involves standardizing practices and facilitating secure and efficient development processes, ensuring cohesive and secure software development across the enterprise.

Open-source communities have always been pivotal in tech. How do you believe they shape the technological landscape, especially in areas you're actively involved in?

Arvind Shetty: Open-source software is vital in accelerating development and problem-solving through crowdsourcing. It offers speed and agility, allowing developers to contribute to innovative solutions. However, challenges exist in terms of security, scalability, and quality. Open source may only sometimes address large-scale requirements or focus heavily on security. The effectiveness of these solutions varies depending on their integration within an organization. Enterprises must carefully evaluate and choose open-source options that align with their needs. Successful implementation requires integrating these solutions into existing systems, emphasizing security and quality to meet organizational standards.

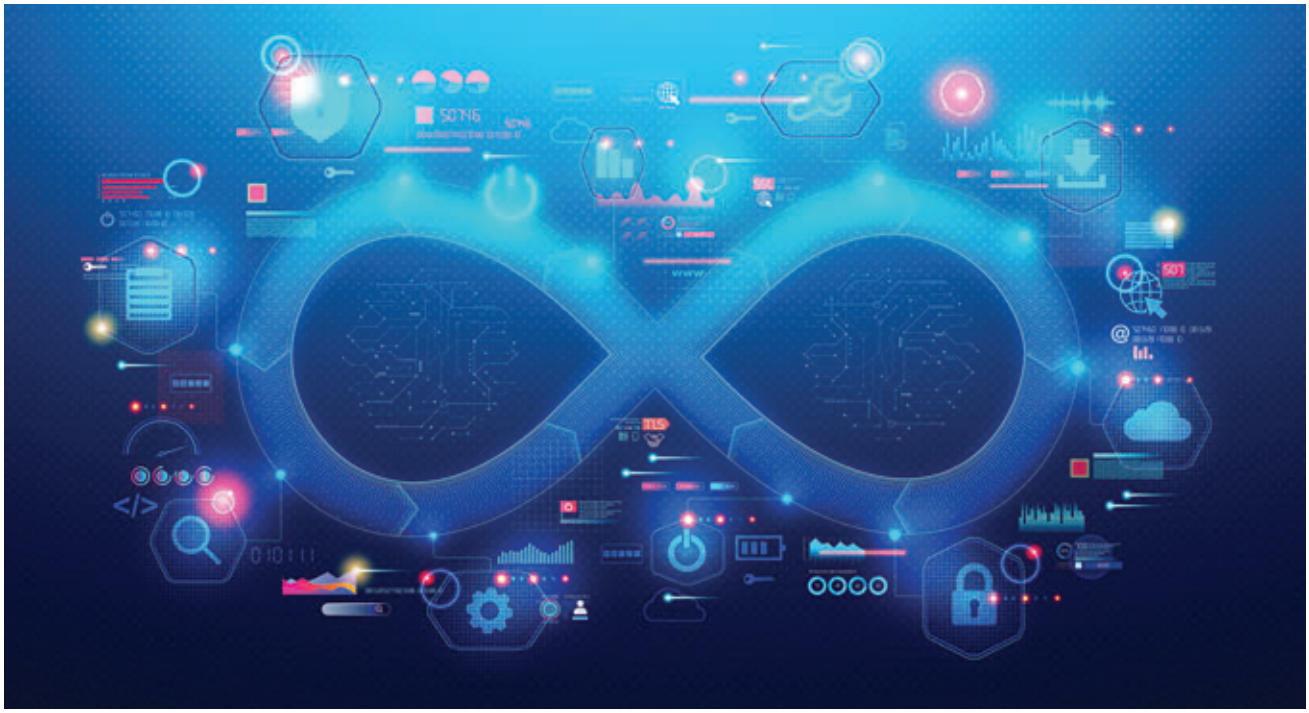
Given the importance of accessibility in today's software solutions, how do companies prioritize and implement it in their development processes?

Arvind Shetty: The concept of bridge thinking, particularly in the context of the Kyndryl platform, is fundamentally anchored in flexibility. This flexibility is characterized by the capacity to integrate capabilities from various sources seamlessly. These sources include internal offerings within the Kyndryl platform and external services from other technology vendors or providers.

Such an approach is crucial for rapid value realization. Using exposed APIs and compliance with industry standards makes integrating various components securely and efficiently possible. This capability is central to the vision for Kyndryl Bridge, focusing on creating significant value for customers, particularly in infrastructure and automation.

Infrastructure automation is particularly vital, aiming to accelerate deployment, facilitate the smooth retirement of systems, and efficiently tackle infrastructure-related challenges. This not only speeds up problem resolution but also cuts down the costs associated with managing incidents for customers.

Moving up the value chain involves a strong focus on applications, modernization, and migration layers. Clients demand solutions that are not only quick and secure but also seamlessly integrated. They prefer flexibility over being tied to monolithic products that necessitate complex modifications within their existing systems. This desire for flexibility is crucial in delivering efficient, secure, and tailored solutions that align with the dynamic requirements of the contemporary technological environment.



Enterprises look for solutions that are not only quick and secure but also seamlessly integrated. They prefer flexibility over being tied to monolithic products that necessitate complex modifications within their existing systems.

In today's competitive landscape, total transparency of the technological environment is crucial. How can enterprises ensure transparency, and how can it impact decision-making processes?

Arvind Shetty: Transparency and trust in organizational processes are crucial, varying significantly depending on one's role. Each role, whether a service desk agent, a call center operator, a bank manager, or a C-suite executive, requires a different level of transparency appropriate to their responsibilities and decision-making needs.

For instance, a call center agent needs access to comprehensive information to make informed decisions during customer interactions. This level of transparency is vital for them to serve customers effectively. On the other hand, a CXO requires a broader view of the organization to make strategic decisions. This might include insights into customer issues, service modifications, and agent empowerment.

The key to empowering decision-making at all levels is syncing and governing data effectively across the organization. This governance ensures trust in the data, which in turn builds trust in the responses provided to customers. Transparency and trust in the representation of the company to customers are equally important.

In addition to transparency and trust, data integration, governance, and quality are essential. These elements ensure that the data is reliable and secure. With different roles accessing varying levels of data, it's critical to have robust security practices in place to prevent unauthorized access and data misuse. Rule-based engagement across the organization must be meticulously managed to maintain data integrity and prevent leakages.

Balancing transparency with data governance and security is fundamental in an organization. This balance ensures that all employees, regardless of their role, have the appropriate level of access to information, empowering them to make decisions effectively while safeguarding sensitive data.

With the increasing reliance on remote work and distributed teams, how do you ensure that your company's technological infrastructure is flexible and robust enough to support these changes while maintaining security standards?

Arvind Shetty: Effectively managing a distributed workforce involves:

- Critical elements like maintaining productivity with flexible work arrangements.
- Ensuring workstation security against data breaches.
- Implementing DevSecOps for standardized and secure development.
- Embracing cultural inclusivity to integrate diverse teams.

Secure remote access to company networks and aligning organizational culture with remote work practices are also essential. These factors collectively ensure efficient, secure operations and team cohesion across various locations, neglecting any aspect potentially leading to security risks, reduced productivity, and cultural misalignment. ■

Real-time data mobility plays a crucial role in unlocking intelligent insights

In a recent dialogue with CIO&Leader, **Piyush Agarwal,** SE Leader at Cloudera, delved into the challenges and optimal approaches for businesses in managing data amidst the changing hybrid cloud landscape.

By **Jatinder Singh**

PIYUSH AGARWAL
SE Leader at Cloudera

The increasing adoption of multi-cloud environments, digital ecosystems, and AI-driven tools has transformed how businesses handle data storage, processing, and management. A robust data management strategy and effective data utilization are essential today. To navigate the complexities of creating a solid data strategy, investing in cutting-edge analytics tools, such as modern data platforms, is crucial for deriving value from data, regardless of location.

Piyush Agarwal, SE Leader at Cloudera, an American software company, recently spoke with Jatinder Singh, Executive Editor of CIO&Leader, about the challenges businesses face in managing data in the evolving hybrid cloud landscape. In the conversation, he shared insights on the best practices for various data platform solutions and discussed the journey toward modernization.

Cloudera, an enterprise data management and analytics platform, claims to have been designed to work seamlessly with all major public cloud providers, such as Azure, AWS, and GCP. It offers tailored solutions for customer analytics, IoT, security, risk, and compliance, providing the fundamental structures for businesses to treat data as a commodity that can be monetized for new revenue streams, drive innovation, and deliver cost savings.

Here are the excerpts from the interview.

CIO&Leader: With the global surge in data, how can businesses adapt and evolve their data management techniques for the next decade?

Piyush Agarwal: In today's digital economy, enterprises are witnessing more significant volumes and varieties of data from an ever-increasing number of sources. This surge in data complexity poses substantial challenges for organizations trying to access, utilize, and derive value from their data, as traditional data infrastructures often need more processing capabilities to support these needs effectively.

Most enterprises' primary focus is the generation of real-time insights for business-critical decisions. Maintaining agility in the rapidly evolving digital landscape demands businesses continually refine their cloud strategies and embrace robust data strategies. Investing in advanced analytics tools, such as modern data platforms, enables companies to unlock value from their data, regardless of location.

The investment in a comprehensive end-to-end data management and analytics platform capable of efficiently ingesting, processing, analyzing, and modeling data has become critical to extracting meaningful insights from the vast amounts of data they encounter. Advanced analytics features, including artificial intelligence, machine learning (AI/ML), and a built-in security and governance

layer, are integral to achieving this goal. This layer must be consistently applicable across all a company's cloud and on-premise environments, ensuring the business can identify and manage sensitive data for compliance purposes without impeding operational workflows.

CIO&Leader: How can modern data platforms cater to diverse industry requirements, especially in sectors that have historically been less data-driven?

Piyush Agarwal: Data is a strategic asset and will remain digital gold for business. Making sense of every bit of data will allow companies to derive more excellent value, from becoming more attuned to their customers' needs to providing improved service to manage their supply chain better. The potential is even more significant for businesses in less data-driven industries like retail, energy, or automotive.

To fully leverage data, organizations need the ability to quickly move data across environments for analysis and modeling in real-time. With these capabilities, businesses can easily manage vast, intricate datasets to support rapidly evolving analytic needs.

For instance, we are working with oil and retail Thai conglomerate PTT Oil and Retail Business Public and Company Limited (PTTOR) to power their organization's data architecture. This allows them to design omnichannel experiences for online and in-person shopping at their gas stations and restaurants. We have also worked with German retailer NEW YORKER to harness their inventory data, leading to improved retail operations and order monitoring at their stores for seamless in-store experiences.

CIO&Leader: Can you provide a real-world example of a business that underwent significant transformation by harnessing the power of modern data platforms?

Piyush Agarwal: In India, we have helped YES Bank, one of the largest private sector banks, architect its data strategy to simplify banking for its customers. YES Bank required a solution framework that could offer speed, agility, flexibility, and the storage capacity needed to process unstructured data and conduct real-time analytics, all while enhancing data security. Central to this endeavor was implementing a platform capable of meeting the rigorous governance standards and strict data security regulations prevalent in the financial services industry.

In collaboration with YES Bank, we developed a 'unified on-premise data management platform,' enabling the Bank to craft bespoke and innovative solutions with faster turnaround times for product launches and updates. Integrating Cloudera Shared Data Experiences (SDX) technologies within the platform alleviates compliance concerns and ensures secure data access for numerous users. This has helped the Bank internalize a previously outsourced customer loyalty program, resulting in a quarter of a million dollars in annual savings.

We are also helping a leading Indian fintech platform, PhonePe, achieve greater operational efficiencies and higher scalability, agility, flexibility, and reliability through our unified data solution, CDP.

CIO&Leader: What are the driving factors behind the shift from traditional data lakes to Data Lakehouse architecture? Why is this architecture pivotal for modern businesses?

Piyush Agarwal: Traditional data lakes act as a unified data repository, storing all collected data from various sources in unprocessed form, including structured, unstructured, and semi-structured data. They often complement a business's data warehouse, enabling companies to enjoy the analytical flexibility of data lakes and the simplicity and speed of SQL queries in data warehouses. Although this architecture offers the economic advantage of inexpensive, scalable storage within the data lake, it also presents challenges such as data duplication, limited analytical service support, and inflexibility. With data confined to the data warehouse, running analytics incurs high transformation and integration costs, leading to unacceptable delays.

The Data Lakehouse model merges the best attributes of both worlds by supplanting the largely independent data lake and data warehouse architectures. It offers a more structured approach that addresses the limitations of each while preserving their respective benefits. By merging the storage and processing capabilities of data lakes with the relational querying functionality of data warehouses, data lakehouses eliminate data duplication and support a comprehensive ecosystem of analytical engines and advanced analytics, including machine learning. This marks a significant step towards a more streamlined, efficient, and agile data management strategy.

However, companies' analytic needs evolve rapidly. Modern data lakehouses cater to business intelligence, AI/ML, and data engineering within a single platform. Achieving this effectively necessitates a willingness to explore different analytic engines or even vendors.

CIO&Leader: What are the main challenges arising in a hybrid cloud environment, and how can they be addressed effectively?

Piyush Agarwal: Hybrid cloud environments enable businesses to be flexible, agile, compliant, and scale according to their needs. However, this often results in data trapped in silos across different infrastructures, presenting significant challenges in accessing or managing it. Rapid global digital transformation has also created interconnectedness – which means more entry points that businesses must actively safeguard against.

Unlocking more profound value from data requires that organizations re-architecture their data platforms for portability and to realize synergies across environments.

The key to the success of any LLM or generative AI model lies in understanding data and enterprise context.

CIO&Leader: How can we ensure that AI algorithms remain transparent and understandable when dealing with vast and intricate data sets?

Piyush Agarwal: AI is only as good as the data it has been trained on. The business's ability to trust its AI begins with trusting its data. Ensuring data quality, accuracy, and consistency by documenting data sources, handling missing values, and addressing data biases goes a long way. It is imperative to choose relevant and interpretable features and avoid overly complex or irrelevant ones. Additionally, businesses should publish transparency reports that provide insights into the model's behavior, strengths, and limitations. This can build trust with users and stakeholders.

Strong data governance measures can further ensure the trustworthiness of data and mitigate these risks. Good data governance clearly defines who is responsible for which data and ensures data is in the right hands and properly handled while accessed, modified, archived, and deleted. Data security, governance, lineage, data management, and automation are applied holistically across the data lifecycle and all environments and consistently across an organization's private and public clouds. Beyond the IT organization or department, all employees are aware of the data they create daily, how to store and access it securely, and how to maintain the same security when working with outside partners, customers, and contractors.

CIO&Leader: With the increasing blend of vast data sources, how can organizations ensure AI's ethical and responsible use?

Piyush Agarwal: AI systems inherently pose several dangers: biases ingrained in AI's foundation (as influenced by humans) and the current lack of regulations and risks surrounding AI's innovation. In developing ethical AI systems that can deal with bias, causality, correlation, uncertainty, and human oversight, it is imperative to maintain strong controls over data management and governance, as well as the ability to reproduce outcomes reliably.

In leveraging data and analytics for informed decision-making, an organization can quickly run into data governance issues, even if the number of data sources used is minimal. Gaps will exist in audit logs if data access policies and lineage are inconsistent across an organization's private and public clouds. More worryingly, poor data quality and lineage may mean a data user decides on incomplete or out-of-date information. Without knowing how data is derived, data users lack trust in their data assets, impacting their ability to make informed, business-critical decisions. The continued use of these data assets hinders the business's ability to innovate and differentiate and may impact the customer experience and brand reputation.

Also concerning are AI hallucinations – users of AI today often encounter instances where generative models produce inaccurate or irrelevant results that appear confident and well-phrased enough to be easily believable.

Trusted AI results from strong controls over your data across its lifetime, from the edge to AI. Businesses must carefully control who or what has access to the data and significantly how the data is transformed or changed over time.

CIO&Leader: How might the integration of LLMs reshape the data analytics landscape? What challenges and opportunities could arise?

Piyush Agarwal: Enterprises view embracing generative AI as a strategic imperative for staying relevant in competitive markets. Central to this success is the enhanced capacity of generative AI and Large Language Models (LLMs) to significantly reduce the time and effort required to prepare unstructured data for analysis and model training. Approximately 80% of organizational data is unstructured, underscoring the invaluable role of technologies like OpenAI's GPT-3 LLM in accelerating AI capabilities within the enterprise.

The key to the success of any LLM or generative AI model lies in understanding data and enterprise context. With widespread interest in generative AI and reduced barriers to entry, more organizations are expected to invest in bolstering their data architectures for seamless integration with existing IT systems and comprehensive control over the data lifecycle. Whether deploying generative or traditional AI solutions, data quality and enterprise context are paramount. Thus, building trust in AI among enterprises becomes essential to realize synergies across data mesh, fabric, and lakehouse environments, facilitating advanced use cases such as generative AI and LLM deployment.

Organizations must develop responsible and reliable generative AI solutions for the enterprise, securely and responsibly leveraging enterprise knowledge bases or proprietary data sources to mitigate privacy risks and contextual limitations. ■

Deploying AI without purpose can lead to a path to uncertainty and stagnation

In a recent discussion with Jatinder Singh, Executive Editor of CIO&Leader, **Amit Luthra**, Managing Director – India, Lenovo ISG, highlighted the company's strategic focus, latest innovations, and its approach to tackling AI workload challenges within organizations.

By **Jatinder Singh**

Amidst the evolving landscape of high-speed computing infrastructure demands, organizations face the challenge of improving efficiencies while meeting the growing demand for AI workloads. Lenovo's Infrastructure Solution Group (ISG) claims to tackle these challenges head-on.

With a focus on AI integration, Lenovo's ISG division offers a comprehensive suite of servers, storage, networking, and solutions; It says that it focuses on enabling organizations to maximize their data center potential.

Expecting robust double-digit growth in the ISG business due to the expanding adoption of hybrid AI, Lenovo foresees a wave of new and promising opportunities emerging for its ISG business in India.

In a recent discussion with Jatinder Singh, Executive Editor of CIO&Leader, Amit Luthra, Managing Director – India, Lenovo ISG, highlighted the company's strategic focus, latest innovations, and its approach to tackling AI workload challenges within organizations.

As Managing Director of Lenovo Infrastructure Solution Group in India, Amit is responsible for driving Lenovo ISG's business growth in the country and advocating its end-to-end offerings from the pocket to the data center to the cloud while driving customer confidence in the data center business across the market. Excerpts from the interview.

AMIT LUTHRA
Managing Director – India,
Lenovo ISG

CIO&Leader: With AI workloads becoming more important and CIOs focusing on modernizing infrastructure, what's your specific vision for this market? And how do your data center solutions deal with these challenges?

Amit Luthra: Our approach is always to focus on outcomes and provide a better end-to-end customer experience. In this process, we do not differentiate between large or small organizations; we provide the same experience regardless of scale. Our global manufacturing facilities and supply chain are rated among the best in the world, focusing on sustainability in everything we do. From an artificial intelligence standpoint, AI has changed how people live and play and how businesses operate. Each organization we engage with seeks to understand how AI can benefit them. Our engagements focus on delivering clear outcomes, regardless of workload or deployment, ensuring an end-to-end experience for our customers.

CIO&Leader: You mentioned customer experience is crucial in the digital era, but integrating existing infrastructure with new solutions remains a challenge for CIOs. How do you ensure these environments' seamless transition

and coexistence to add value for the enterprises?

Amit Luthra: In today's landscape, organizations often encounter two distinct types of workloads: traditional business workloads, sometimes referred to as legacy workloads, and newer, transformative workloads. While "legacy" may suggest outdatedness, these established workloads have matured over the past decade or two, forming the backbone of many operations. Organizations typically have dedicated infrastructure to manage these traditional workloads, which continue to perform reliably.

However, the popularity of social media, mobile technology, cloud computing, and other modern innovations has ushered in a wave of transformative workloads. These new workloads have the potential to revolutionize business practices, requiring organizations to adapt and evolve their infrastructure accordingly. Unlike traditional workloads, transformative workloads often exhibit dynamic scaling needs and may necessitate a different approach to infrastructure provision.

Our approach to addressing these evolving workload demands begins with a comprehensive workshop. During this engagement, we delve deep into understanding each workload's specific requirements and characteristics. By thoroughly understanding the workload, we can explore opportunities to optimize deployment, leveraging existing resources wherever possible. This tailored approach ensures that our solutions align closely with each organization's unique needs.

Ultimately, the success of any project hinges on an organization's ability to grasp and effectively manage the complexities of different workloads accurately. By prioritizing workload-centric engagement and demonstrating tangible value to our clients, we pave the way for more successful outcomes and sustainable business transformation.

CIO&Leader: How do you see the overall development of the AI ecosystem? And what particular challenges is Lenovo addressing in this regard?

Amit Luthra: In today's landscape, AI has become a buzzword, with many organizations feeling pressured to jump on the bandwagon without fully understanding its potential. This phenomenon often leads to the "FOMO effect" — a fear of missing out on AI's promised benefits. However, simply deploying AI for the sake of it can leave organizations in a state of uncertainty, stuck in the whiteboard stage without a clear understanding of its practical applications.

On the flip side, we've observed a common thread among successful organizations: forming cross-functional teams, or what some refer to as "tiger teams." These teams bring together individuals from IT, data science, business analysis, and finance to collaboratively explore how AI can drive meaningful change within their operations. Rather than diving into AI unquestioningly, these teams start by asking critical questions: What specific business challenges are we aiming to address with AI? Are we looking to enhance customer satisfaction, streamline operations, or improve fraud detection?

Organizations can embark on a successful AI journey by defining clear objectives and assembling the right talent. For example, one organization we worked with aimed to streamline content creation using generative AI. By aligning their AI efforts with their core objectives, they could transform verbose content into concise, visually appealing infographics, significantly reducing production time.

From our perspective, AI isn't a new concept; it's rooted in years of research and development. Leveraging our legacy in high-performance computing, we've tailored over 150 platforms specifically for AI applications. Rather than offering one-size-fits-all solutions, we work closely with our clients to understand their unique data needs and design custom AI platforms accordingly. Ultimately, the key to successful AI implementation is marrying AI with data. Whether deploying AI at the edge for real-time data analysis or leveraging AI to derive insights from vast datasets, the goal is to empower organizations to make data-driven decisions effectively.

CIO&Leader: Do you think AI and Automation will significantly change how businesses operate in the next two to three years?

Amit Luthra: When we look at AI and automation, it's evident that they walk a fine line, divided by nuanced differences. AI is primarily geared towards handling non-repetitive tasks, whereas automation thrives in managing repetitive tasks efficiently. While there's a common misconception that AI automates processes outright, it's crucial to recognize their distinct roles. To truly revolutionize business operations, AI and automation must complement each other seamlessly.

The true power of AI lies in its ability to facilitate decision-making processes. For instance, AI-driven robotics can autonomously make decisions, whereas automation typically entails following predefined rules learned through training. Herein lies the synergy: AI contributes the intelligence, while automation provides the structured execution. The harmonious collaboration of these technologies holds the key to transformative outcomes.

I firmly believe that harnessing the synergy between AI and automation holds immense potential to drive substantial business growth in the foreseeable future. As organizations refine their deployment strategies and optimize efficiency, we can anticipate a palpable surge in productivity and innovation across various sectors.

Consider, for instance, the manufacturing domain, where AI-enabled robotics can streamline operations significantly. While AI creates the robots themselves, automation steps in to train and fine-tune their capabilities, encompassing modules such as inference and generative AI. This holistic approach underscores the synergetic

relationship between AI and automation, likely to reshape industries and unlock unprecedented possibilities.

CIO&Leader: But one of the biggest challenges for the industry has been the talent shortage, especially in AI and other emerging technologies. Are you undertaking any collaboration programs or initiatives to address this issue?
Amit Luthra: Indeed, talent shortage is a significant concern. We collaborate with ISVs and OEMs to identify niche vendors and innovative solutions. Our focus is on educating the industry on AI basics and enabling them to understand the potential of AI. While there's still much to learn, collaboration and continuous learning will drive progress in the AI space.

CIO&Leader: How is Lenovo advancing in terms of new innovations and partnerships?
Amit Luthra: With the rise of IoT and increased data analytics at the edge, we've developed purpose-built edge platforms. These platforms allow for GPU deployment in harsh environments, enabling real-time analytics without transmitting data to centralized locations.

I firmly believe that harnessing the synergy between AI and automation holds immense potential to drive substantial business growth in the foreseeable future.

Regarding ecosystems, it's essential to understand the three areas where AI can benefit data center infrastructure: We collaborate with cloud providers in the public cloud to deploy AI-specific platforms for hyperscalers. In private cloud environments, we offer optimized platforms to accelerate AI adoption, fostering centers of excellence and AI discovery. We provide uniquely tailored solutions for sectors like retail, facilitating the transition to AI-powered computing.

Our commitment to AI innovation is substantial, with a billion-dollar investment in our AI Innovators Program. We collaborate closely with ISVs through this program to optimize infrastructure for specific use cases. For example, we have partnerships with Deep Brain in Korea and the US and others in retail, IoT, and BFSI sectors.

CIO&Leader: Considering Lenovo's substantial growth in the ISG business in India, what are your expectations for the next year, and how do you foresee addressing the industry's challenges and opportunities?
Amit Luthra: This year holds promise for significant growth, with a focus on hybrid cloud management, infrastructure modernization, and hyper-convergence. We're seeing a trend toward repatriating AI workloads, indicating a shift in IT strategies. Investments in as-a-service models and AI-driven solutions will drive innovation and address the evolving needs of the industry. ■

TPL 2023: A Thrilling Season of Innovation and Excellence

India's premier IT strategy competition saw top CIO-led teams tackle real-world challenges with innovative solutions.

By **CIO&Leader**

The best of India's IT minds gathered at the Jio World Center in BKC, Mumbai, on Wednesday, 6 December 2023, to celebrate innovation, strategy, and camaraderie. The 2023 edition of Technology Premier League (TPL), presented by CIO&Leader in partnership with Microsoft and Kyndryl, was nothing short of spectacular. The objective of the competition is for every team to analyze a business situation (case study), prepare an IT strategy, and propose an IT project aligned with the

(from left) Kersi Tavadia, Dr. Prashun Dutta and Dhananjay Tambe

organization's business needs. The case studies in this year's TPL were from Manufacturing, Retail, and BFSI verticals.

Championing innovation through real-life challenges

TPL 2023 was not just a typical tech event; it was India's exclusive IT strategy competition. It served as a friendly battlefield where enterprise IT teams led by top CIOs showcased their ingenuity in solving real-life business challenges using innovative IT solutions. The event tested strategic thinking, teamwork, analytical skills, and problem-solving abilities within set constraints.

The participating teams were provided with different sets of case studies and tasked to present their strategic solutions to address the challenges to an independent jury of luminaries, each with a stellar IT background. The jury, comprising Dr. Prashun Dutta, Management Consultant & Author, ex-CIO, Tata

Delegates at the event

Delegates during the case study

Power Company; Dhananjay Tambe, CEO, C-Edge Technologies, ex-Deputy Managing Director & CIO, State Bank of India; and Kersi Tavadia, Executive Coach & Capital Markets Leader, StatusNeo, ex-CIO, Bombay Stock Exchange, brought a wealth of experience to the table, making the evaluation process exceptional.

The cream of the crop: team eligibility criteria

Each team represented a distinct Indian company, composed of three members led by the CIO (or equivalent) and two other members, all holding managerial or equivalent designations with a minimum of 5 years of full-time work experience. This ensured that only seasoned IT professionals graced the battlefield, ready to face formidable challenges ahead.

The case studies for TPL 2023 were thoughtfully curated from the Manufacturing, Retail, and BFSI verticals, offering diverse challenges that put the participating teams' skills to the ultimate test.

Speakers

TPL 2023 featured the following lineup of speakers who added an extra layer of brilliance to the event:

- Sreekrishnan Ventateswaran, the CTO of Kyndryl India, shared insights into the world of IT innovation.
- Seema Kumar, Director – Azure Infrastructure Solutions at Microsoft, provided a glimpse into the future of technology.

Participating Teams

Nineteen enterprise IT teams from renowned organizations came together to compete in TPL 2023. The list of participating teams is:

- Aditya Birla Textiles
- Aegon Life
- Asian Paints
- Axis Asset Management Company
- Godrej Industries
- IDBI Bank
- Jio Platforms
- Kotak Life
- Kotak Private Banking
- L&T Realty
- RBL Bank
- SBI
- SBI General Insurance Company
- SBI Life Insurance Company
- SBI Mutual Fund
- Sony Pictures Networks India
- Supreme Industries
- UPL
- Yes Bank

After two hard-fought rounds that kept everyone on the edge of their seats, the distinguished jury, following careful and intense deliberation, announced the winning teams of Technology Premier League (TPL) 2023.

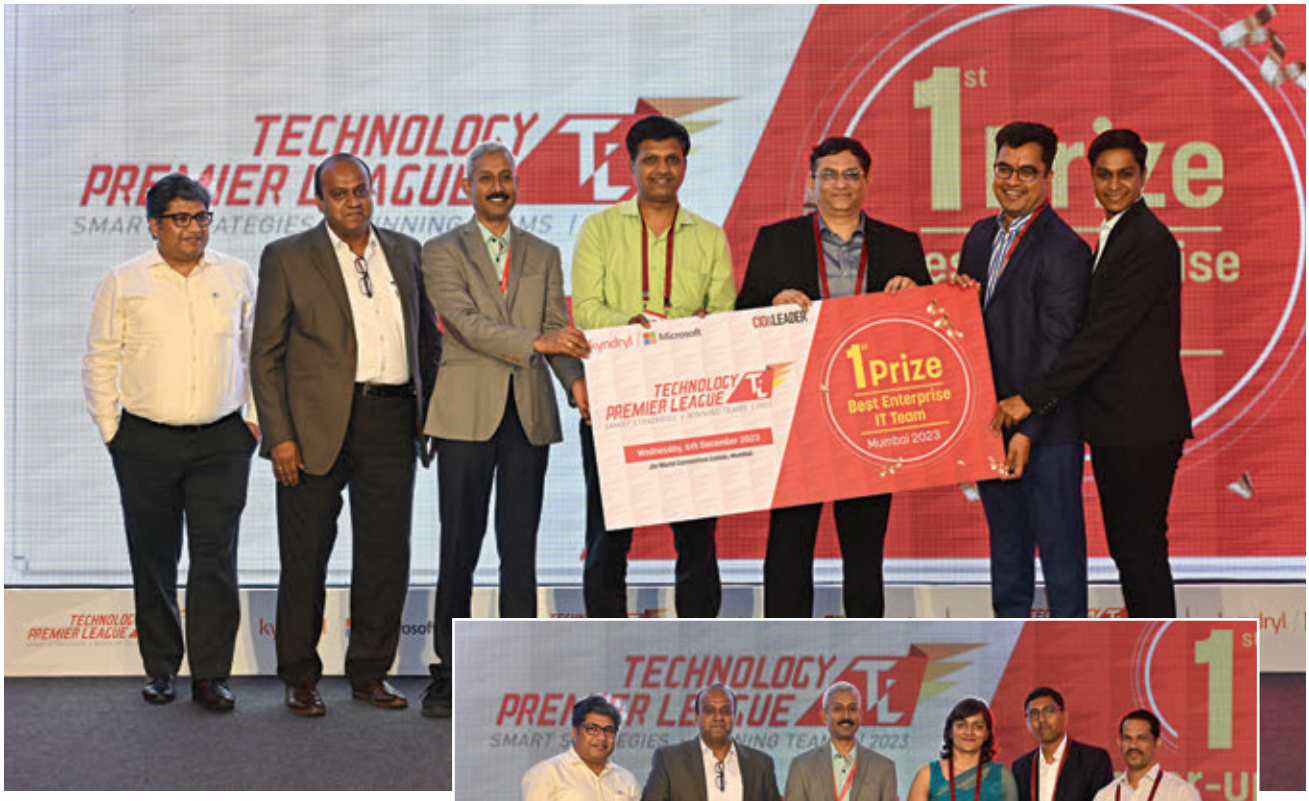
Sreekrishnan Ventateswaran, CTO of Kyndryl India

Seema Kumar, Director – Azure Infrastructure Solutions, Microsoft

Victorious Standings

- Winner: Team L&T Realty
- 1st Runner-up: Team UPL
- 2nd Runners-up: Team Kotak Life

As a token of appreciation, all participants were presented with an assured 1 gm, 24k Gold Coin. Acknowledging their outstanding efforts, the 2nd runner-up team members were rewarded with an assured 2 gm, 24k Gold Coin, while the 1st runner-up team members received an assured 3 gm, 24k Gold Coin. The winning team members, standing on the pinnacle of success, were honored with an assured 5 gm, 24k Gold Coin.



↑ **Winner:** Team L&T Realty

Beyond the thrilling competition, TPL 2023 unfolded as a grand finale offering intense battles and a platform for unlimited fun and networking opportunities. As the sun set on a day filled with innovation and strategy, participants and attendees exchanged thoughts in a delightful evening of cocktails and dinner. This provided an opportunity to forge new connections and strengthen existing bonds, turning TPL 2023 into an experience that transcended the ordinary.

Conclusion

In conclusion, Technology Premier League 2023 emerged as a superhit, bringing together the best minds in the industry for a memorable event that will resonate for years to come. It showcased the power of innovation and the strength of teamwork and celebrated the brilliance of India's top CIOs and IT leaders. TPL 2023 was more than just an event; it was a resounding testament to the unwavering spirit of progress and excellence! ■

↑ **1st Runner-up:** Team UPL

↑ **2nd Runners-up:** Team Kotak Life

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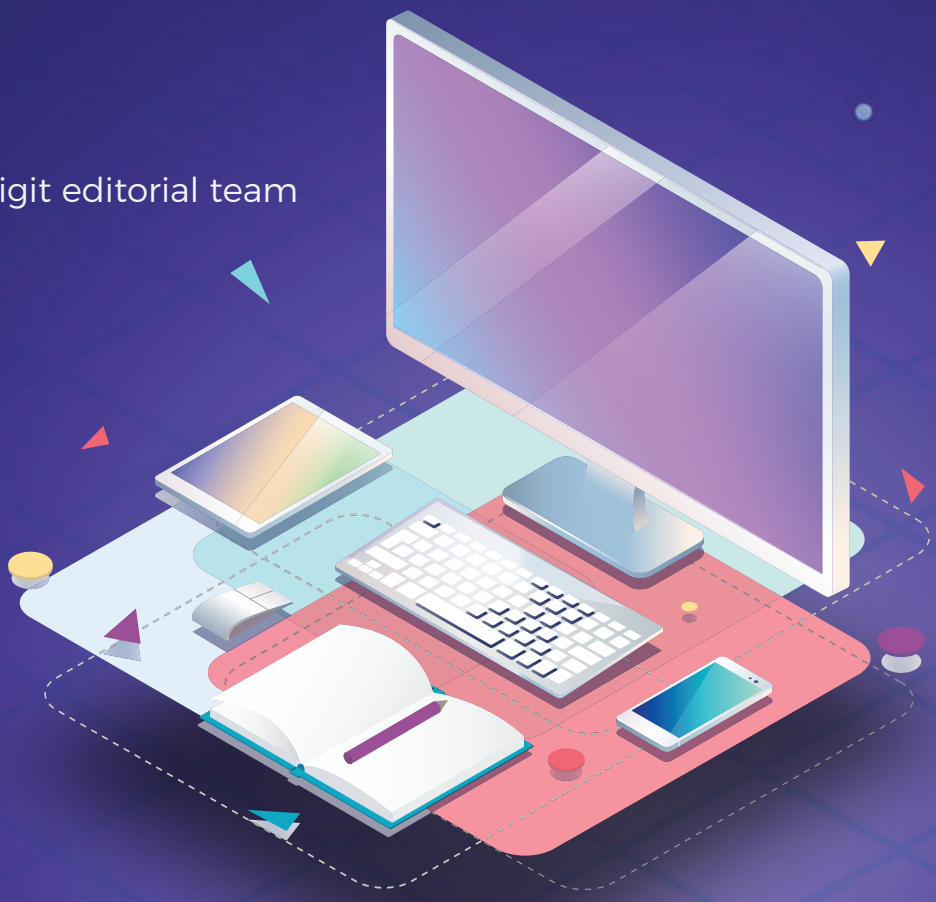

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