

»»» SOUTHEAST ASIA TECHNOLOGY TRENDS & PRIORITIES FOR 2023



Spark

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ABOUT SPARK

SPARK (formerly CIO Academy Asia) helps leaders succeed in a fast-changing world driven by technology advancements. We create platforms where CIOs, business leaders and thought leaders share their insights, knowledge and expertise with the wider community of executives in business, government and technology community organisations. We help our community of C-level leaders to stay ahead of the industry by navigating the evolving technology landscape with new and practical knowledge shared by their peers.

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Executive Summary

There has never been a greater time of change such as now. Artificial intelligence has finally broken free of research labs and unleashed a new wave of open AI technologies that is easily accessible by consumers, in most cases, for free! AI is experiencing renewed interest. This time, it will become pervasive, with ChatGPT dominating headlines and receiving more than 25 million daily visits, accompanied with an explosion of no-code AI tools that will enable businesses to create more intelligent products and services.

Is the metaverse going to remain a weak signal for long? With augmented and virtual reality technology advancing, companies will be able to create more immersive meeting environments, and develop more advanced avatar technologies. Coupled with ongoing developments of blockchain technology despite the dreaded “crypto winter”, businesses will not be deterred for long to create more decentralised products and services, tokenised business models. The bridging of the digital and physical worlds, which some are calling the “Phygital World” will accelerate, with the use of digital twin technology and 3D printing becoming more widespread.

Quantum computing will be another trend to watch closely in 2023, with the potential to revolutionise computing by processing and storing information at a trillion times faster than traditional processors. However, the technology also presents a significant challenge in terms of encryption, and businesses will need to be prepared for potential breaches. Finally, there will be a continued push toward more sustainable technology, with a focus on making supply chains more transparent and using energy-efficient products and services. To remain competitive, businesses will need to embrace these.

Against the backdrop of today’s dynamic technology environment, companies urgently have to develop scalable and



"‘Phygital’ will be the new battle-ground, and AI will be the new arm’s race."

resilient data-driven strategies, build agility, and greater resilience than before. Combined with the acquisition of new skills and capabilities, organisations also need to take fresh approaches to digital leadership, not only to garner support at the top, but to dramatically democratise access to high powered, yet simple-to-use technology tools to successfully transform organisations into one that is ready for the digital unknown.

The SPARK Southeast Asia Technology Trends and Priorities Survey is a unique study conducted annually to provide insights into how organisations in Southeast Asia can use technology more effectively, to drive their businesses and remain competitive. The survey findings offer some revealing insights into key digital imperatives for today's leaders. Southeast Asia's leading tech practitioners have revealed several significant drivers, challenges, and trends.

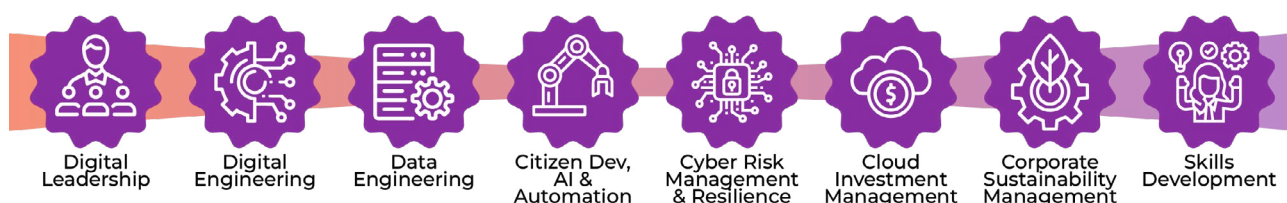
Respondents from Southeast Asia comprised senior executives from a diverse range of corporate functions and industries. Employee size for most of the organisations range between 1000-3000, while 45% represent organisations with employee sizes of at

least 1000 employees conduct business in more than one country in Southeast Asia.

One of the biggest drivers of digital transformation in Asia is the need to keep up with the rapid pace of innovation and change in the region. With China emerging as a major global player in the tech industry and other countries in the region investing heavily in emerging technologies, Asia's leading tech practitioners must be agile and adaptable in order to stay competitive.

However, this rapid pace of change also presents challenges. The biggest challenge facing Asia's leading tech practitioners is the shortage of skilled talent in the region. With demand for digital talent outstripping supply, companies must find new ways to attract and retain top talent in order to drive innovation and growth. Tech practitioners continue to walk the thinning tight rope, balancing innovation with regulation. In such times of rapid technology advancements, organisations must collaborate closely with governments and regulators to provide industry feedback in shaping regulations, and ensure compliance while continuing to push the boundaries of what is possible.

This year, our survey will cover 8 key areas that will shape digital transformation strategies for the next 1-2 years, they include:



Tech leaders are taking the driver's seat and driving transformation from the top

The top three digital leadership priorities from our survey focuses on optimising past and future digital investments, change management and business process transformation, as well as building a data-driven business. Organisations need to align business and IT strategy to drive digital transformation success. A data-driven approach is required to ensure technology initiatives deliver desired outcomes both within financial reporting cycles and in the long term.

Organisations also urgently need to improve the "Digital Quotient" of their workforce, Digital champions can help drive digital transformation efforts from within. Low-code and no-code tools significantly shorten the adoption cycle for business partners and simplify data

collection processes. Many organisations have adopted Agile SCRUM, Kanban, and Chief Transformation Officer roles and the likes have sprung up, in hopes to bridge the gap between business and IT

Organisations are retaking ownership of digital engineering, tech leaders mindful of creating new technical debt

Digital engineering has only recently been brought in-house within the last 5 years, and organisations are just starting to build sophisticated and hopefully, future-ready architectures on multi-cloud operations environments. Tech leaders need to focus on developing a cohesive strategy for workload placement, data management and governance, while also ensuring security and compliance across multiple providers. Additionally, automating development processes can streamline software delivery, reduce errors, and improve collaboration between development and operations teams. Establishing technical debt management controls in DevOps processes is also crucial for future-proofing digital apps and services.

The Kubernetes, Docker, and Istio combination has become the most popular container orchestration platform, with over 87% of Fortune 500 companies using variations of it. However, managing the interdependencies between services and ensuring consistent deployment and management practices becomes increasingly important as services are broken down into smaller components.

Managing multiple clouds requires careful planning, investment, and execution to maximise benefits and minimise risks. Site Reliability Engineering (SRE) teams should work closely with DevOps teams to improve infrastructure and reduce communication gaps. By addressing technical debt, organisations can reduce risks, improve system stability, and enhance the quality of their digital products and services.



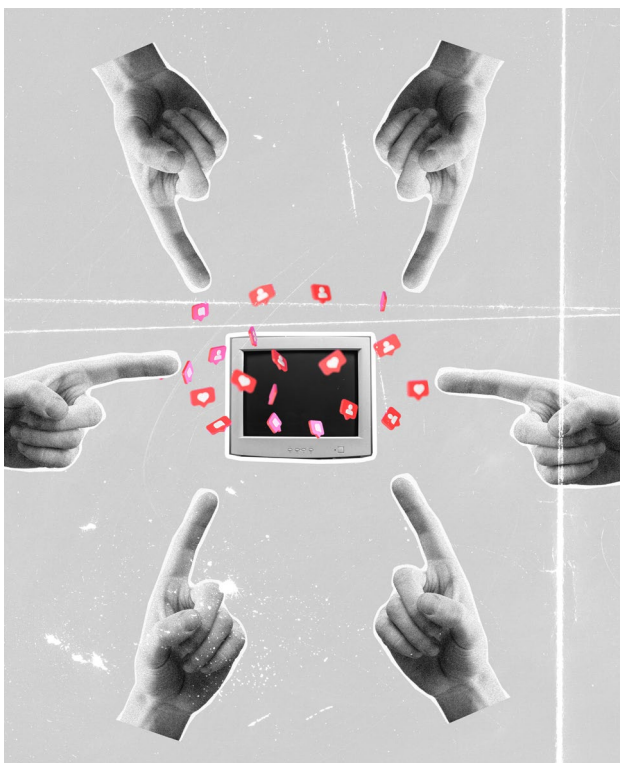
"Building digital quotient is not about mastering technology, it's about developing new ways of thinking and working."

- Peter Weill, MIT

Data processes have made it into the core business, service reliability is now key to any enterprise data strategy

The exponential increase in data generation and complexities of managing and securing data have made improving data governance and automation capabilities top priorities for data engineering teams. Data accuracy and trustworthiness are critical for compliance with personal data protection laws, such as GDPR. Centralising data management through master data management initiatives has become popular to ensure consistency in governance policies across organisations. Analytics have become embedded in core business operations, making it essential to maintain a high level of service reliability in today's mission-critical data workloads.

Poor data classification, lack of storage tiering, and unnecessary replication can lead to increased cloud bills without realising any intended cost savings. The use of cloud-based data management tools such as data virtualisation, data mesh, and data fabric brings pros and cons, and tech leaders must choose the best way to organise data that delivers the maximum business value for their organisations.



Generative AI paves the way for the democratisation of technologies to the workforce, governance and risk management will have to keep up

Organisations can increase productivity and work quality by leveraging intelligent productivity tools for routine tasks and generative-AI models for knowledge tasks. This approach can unlock productivity gains for knowledge workers and streamline workflows, leading to significant time and cost savings. Companies in healthcare and technology industries have already successfully leveraged AI and natural language processing to automate customer service chatbots, now with the possible augmentation of generative AI, hold great potential to significantly improve response times and drastically enhance customer satisfaction.

While there are challenges associated with adopting automation, such as significant upfront investment and resistance from certain stakeholders, tech leaders can develop a comprehensive plan for automation that addresses the concerns of all stakeholders and highlights the benefits of automation. This may include conducting pilot projects, providing training and support to staff, and involving employees in the design and implementation of automation initiatives. At the same time, we expect new start-ups that will spring up to provide enterprise grade low-code/no-code AI capabilities to businesses, that layer on robust governance and data security required by companies adopting such technologies today. The potential benefits of automation are significant, and field-testing efforts together with small units across the business will help realise quick wins and sustain organisational support for the long term.

Cyber defence is getting intelligent, but is this enough to stop cyber attacks?

As organisations continue to rely more heavily on digital technologies and remote work, cybersecurity threats and vulnerabilities continue to grow. Collaboration and sharing of threat intelligence between organisations is a key priority to enable active cyber defence. With insider threats remaining the biggest threat and weakest link in organisations, managing digital risks requires a coordinated effort across different functions.

Endpoint devices and network infrastructure are prime targets for cybercriminals seeking to exploit vulnerabilities and gain access to sensitive data. Network Segmentation and Isolation, policy based contextual access management and dynamic key and credentials, and extending detection and response capabilities beyond the firewall perimeter both into cloud edge environments and within the firewall network, are key areas to focus on. Network Detection and Response and Cloud Detection and Response tools are also recommended to detect anomalous behaviours and suspicious traffic patterns even between trusted users, apps and machines.

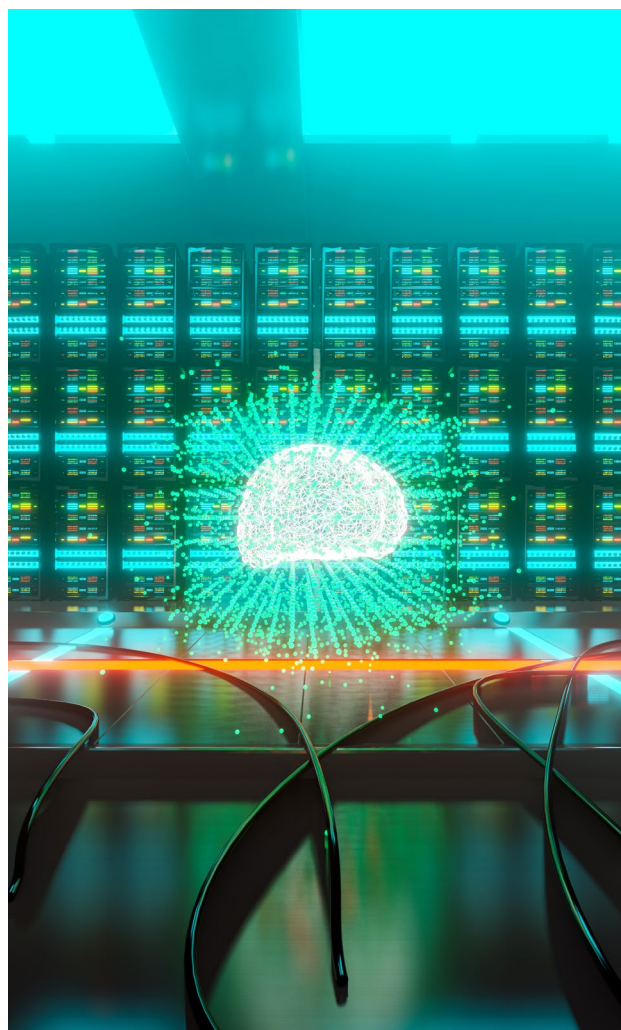
Although Zero-Trust capabilities integrated with advanced AI and ML provided by XDR tool suites have the potential to significantly widen the defence moat between organisations and attackers, the capabilities are still fragmented across the cybersecurity solutions market. Cyber alliances are recommended to explore pre-built integration for best-of-breed solutions while mitigating concentration risks.

Cloud is not getting cheaper, optimisation is key!

Companies face increasing complexity when managing their data on the cloud due to regulatory barriers, compliance standards, and managing various cloud providers. This is especially challenging for larger organisations that use different providers for various purposes and may have legacy systems running on-premise. To optimise financial investments in

cloud infrastructure, companies need to adopt a cloud governance framework and invest in cloud cost management tools. A multi-cloud management platform can help maintain data consistency, control costs and improve security. Managing costs associated with cloud usage is a major challenge, but establishing policies and procedures for controlling cloud access and assigning admin rights can help.

In recent years, tech leaders have focused on optimising performance per dollar cost investment and quantifying business outcomes from cloud investments. Respondents have placed a strong focus on implementing cost tracking and cost attribution for cloud as a continuous process while developing in-house capabilities to automate right-sizing, performance, storage tiering and auto-scaling techniques. Organisations are also adopting built-in-the-cloud tools and platforms which work natively with cloud capabilities such as serverless computing, containerisation and other microservices.



ESG just moved a whole lot up the board agenda, and the C-suite better be prepared

ESG and sustainability have gained importance across industries in the past two years, driven by global goals established at COP27. The IT sector has a significant role to play in achieving these goals and is prioritising initiatives such as implementing real-time optimisation strategies, improving traceability and transparency in supply chains, promoting responsible use of technology and extending sustainability requirements to third-party vendors. Respondents of a recent survey see the need for near real-time data intelligence on day-to-day business operations both internally and externally as major priorities.

External pressures and incentives such as new regulations, sustainability-conscious customer demands, favourable financing terms contingent on sustainability outcomes, or investor pressure impact entire industry ecosystems. Companies that build sustainability-conscious supply chains and communicate the value of their products to consumers will have a leading edge in capturing this market segment. Overconsumption and waste reduction is another key development in digital transformation today. Electronic waste is projected to be the fastest-growing waste stream in the world by 2050. Companies around Asia have begun adding sustainability compliance standards into procurement guidelines for IT. To optimise operations in a climate-positive way without increasing operating costs, businesses require real-time data-driven optimization strategies that can track and monitor key metrics, such as energy usage and waste generation.

Digital Skill is a perennial challenge. Now, extend it to cultivating professional skills in ESG

Digital skills training is crucial for organisations to remain competitive in today's fast-paced technological landscape. A survey of Asia's top technology leaders identified cybersecurity, digital risk management, data management and digital transformation strategy and

change management as the top skills needed. However, the specific skills required depend on the organisation's industry, size and stage of digital transformation.

To stay ahead, organisations must prioritise board and leadership mindshare and change management programmes to instil a digital-first mindset throughout the organisation. Interestingly, sustainability reporting and sustainable IT development have not yet been prioritised, but these talents will be in high demand in the coming years. IT organisations need to start recruiting and developing training programmes to build capacity for the future in these areas.

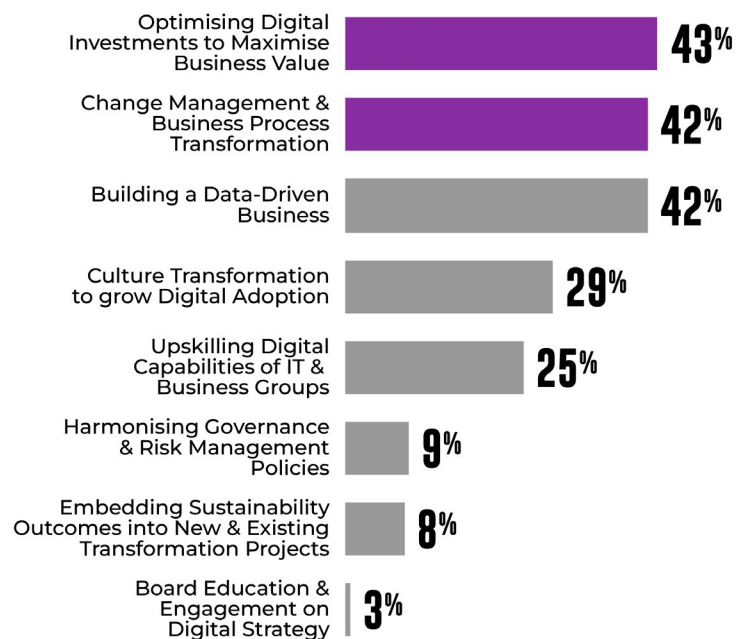


Section 1: Top Challenges and Priorities in Digital Leadership

Digital leadership is crucial to the success of digital transformation and to the overall success of organisations today. According to Mckinsey, companies with strong digital leadership outperform their peers by a significant margin, achieving up to 5 times higher revenue growth and up to 8 times higher EBITDA growth.

The results of the survey on the top digital leadership priorities further emphasise the critical role that digital leadership plays in digital transformation. The top three priorities identified - optimising digital investments, change management and business process transformation and building a data-driven business - are all key components of effective digital leadership. While closing the skills gap and cooperation gap between business and IT remain till today, top challenges for tech leaders to navigate.

TOP 2 DIGITAL LEADERSHIP PRIORITIES THAT WILL HAVE THE BIGGEST IMPACT ON RESPONDENTS DIGITAL TRANSFORMATION ROADMAP



Tech leaders have prioritised optimising digital investments to maximise business value, with 42.15% of respondents selecting this as a top priority. Tech leaders are expected to prove both the long-term value of digital investments, but also consistently ensure the defensibility of ongoing initiatives.

One CIO recently interviewed in our survey for this report said: “We have to be able to demonstrate the ROI on our technology investments in order to sustain the support we need from the business for the long term. We need to be able to show how technology is driving business value and contributing to our bottom line with clear evidence to prove it.”

However, pleasing top management is not all it takes. Change management and business process transformation follows closely, as tech leaders consistently evaluate the digital readiness of existing business processes for meaningful transformation at the core. According to a survey by Deloitte, 74% of CIOs believe that aligning business and IT strategy is the most important factor in driving digital transformation success. This requires a focus on change management to ensure that technology investments are aligned with business objectives and that employees are equipped with the skills and knowledge to adopt and use new technologies.

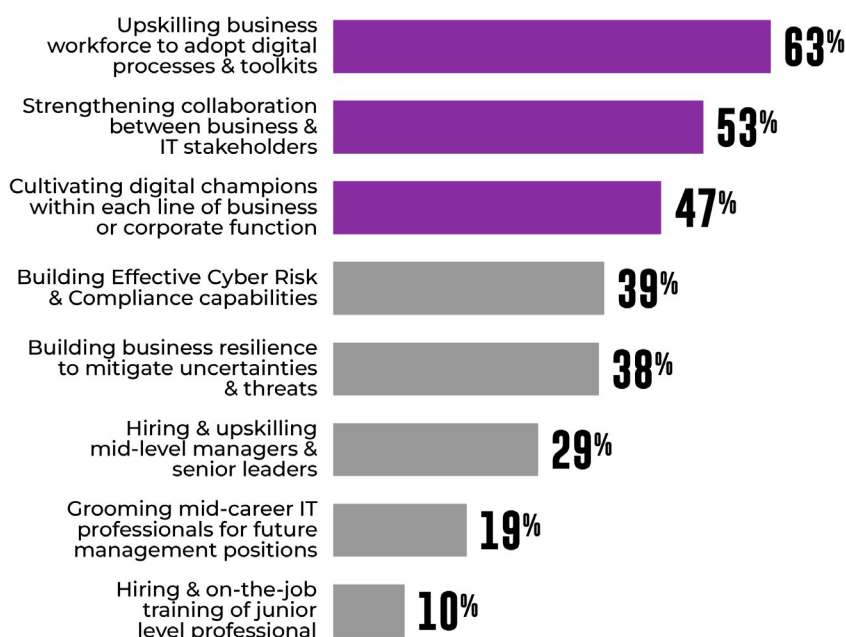
Popular frameworks for change management are numerous, our recommendations is for you to

explore the Prosci AKDAR® Model or the John Kotter's Change Method. However, bear in mind to translate change strategies into clear operational action plans in close collaboration with process owners.

Adopting a data-driven approach to ensure that technology initiatives are delivering the desired outcomes, similar research has shown that more than two thirds of organisations fail to sustain digital transformation efforts due to the lack of clear metrics and compelling data. 40% of survey respondents have selected this as a top priority.

To embed tools and processes to provide insights on key success metrics to ongoing digital projects is no mean feat. Tech teams have to balance data governance with data collection, which means, not to collect anything and everything. Data teams have to prioritise data points of interest based on their intended outcomes.

TOP 3 DIGITAL LEADERSHIP AREAS RESPONDENTS FIND MOST CHALLENGING



When it comes to the areas of digital leadership that officers of organisations find most challenging, improving the “Digital Quotient” of the workforce is both a key challenge and a key priority as the survey has pointed out. Digital Transformation is not the sole responsibility of IT leaders nor is it an IT project. With more than 60% of respondents citing this as a top challenge, organisations have some ways to go in readying their workforce for organisation-wide transformation that requires both tech natives or otherwise, get on the same platforms to collaborate, exchange data and adopt digital processes as one.

Frameworks used for digital leadership initiatives in this area include the 70-20-10 model, which emphasises a blend of on-the-job learning, coaching and mentoring and formal training programs, as well as the use of digital learning platforms to deliver customised training content at scale. Approaches such as Agile SCRUM, Kanban and the introduction of a Chief Product Officer, are ways to bridge the gap between business and IT. That way, engineering and operations teams work closely with business teams on an iterative approach, achieving shorter feedback loops between business and IT stakeholders, to ensure that the digital services being developed meet a real business need.

Another key priority for many organisations is the need to cultivate digital champions who can help to drive digital transformation efforts from within. These champions can come from a

range of different backgrounds and functions and can play a critical role in building buy-in and momentum for digital transformation initiatives across the organisation. About tooling, the use of low-code and no-code, Graphics User Interface (GUI) type of software capabilities significantly shorten the adoption cycle for business partners to get involved in digital transformation initiatives and simplify data collection processes as change management progresses.

Start-ups have sprung up in recent years to aid tech leaders in the management of complex change initiatives. Here is a broad overview of the popular tech solutions we have found that addresses different aspects of change management.

Software Category	Key Capabilities	Popular Examples
IT Planning	Helps organisations optimise their IT budgeting, forecasting, and financial analyses across various IT operations and business transformation initiatives	Apptio, Targetprocess, Planview
Business Process Management (BPM)	Helps organisations document, model, and analyse their business processes. It can be useful in managing change initiatives by identifying process inefficiencies and areas for improvement	Signavio, Nintex, and Appian
Employee Engagement	Helps organisations measure and improve employee engagement. It can be useful in managing change initiatives by providing insights into employee sentiment and identifying areas where employee communication and involvement can be improved	Peakon, Glint, and Culture Amp
Customer Experience Management (CEM) Software	Helps organisations measure and improve the customer experience. It can be useful in managing change initiatives by providing insights into customer feedback and identifying areas where digital services and apps can be improved	Qualtrics, Medallia, and SurveyMonkey

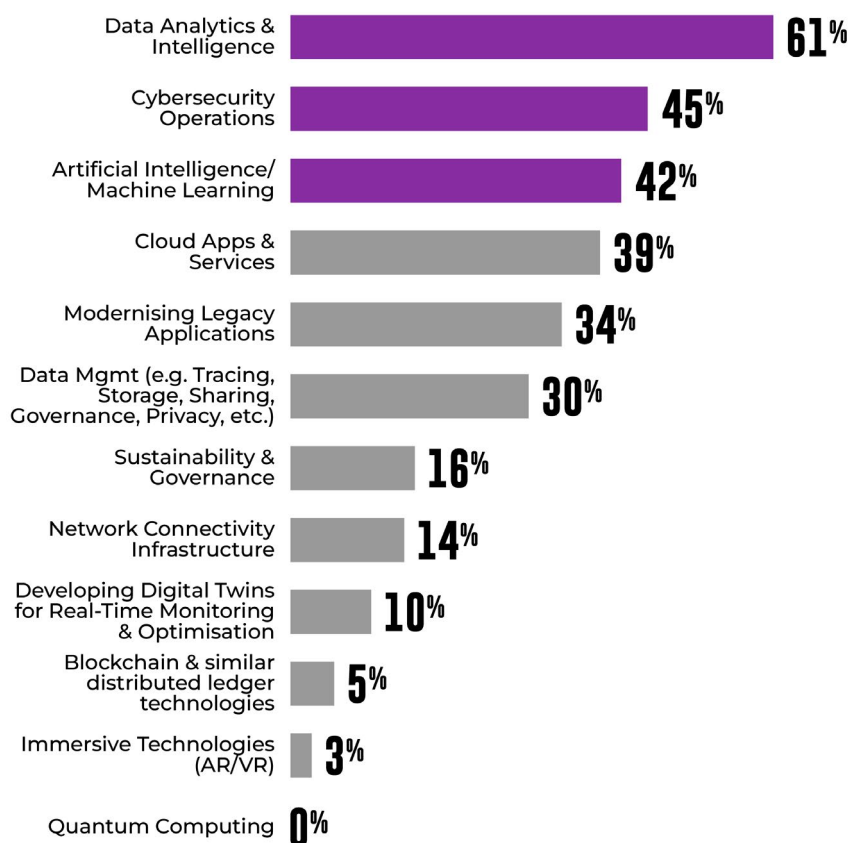
Section 2: Top Tech Areas of Investment

According to the survey responses, Data Analytics & Intelligence emerged as the top investment priority for organisations in the next 1-2 years, with 61% of respondents selecting it. This aligns with the growing importance of data-driven decision-making and the need to leverage data to gain a competitive advantage as seen above in our earlier analysis around building a data-driven business. While organisations double down on advanced analytics, including the adoption of machine learning and artificial intelligence which comes in third on the list, this year's AI and data landscape bring an interesting set of tailwinds and headwinds, especially with the rapid consumer adoption of generative AI, made popular first by the OpenAI project, ChatGPT.

The widespread adoption and availability of generative AI for consumer use will have a significant impact on the course of AI development in companies today. With the democratisation of AI technology, businesses will be able to leverage these tools to improve their operations, enhance customer experiences and unlock brand new competitive advantages. This is the new level playing field now, AI is the new augmentative force that will shape the future of today's knowledge workforce.

The ability for tech and business leaders to be the first to identify use-cases where AI could unlock massive productivity gains or provide meaningful insights to management will determine which companies will be front-runners and which will be left behind. Deloitte research projects that Globally, 70% of companies are using or exploring the use of generative AI to automate tasks

TOP 3 TECH AREAS TECH LEADERS ARE INCREASING INVESTMENTS THE MOST



and augment human decision-making. It is expected that investment into AI research and development will increase significantly in the coming years, as companies strive to stay ahead of the curve. Additionally, as generative AI becomes more accessible to the public, it will be easier for businesses to identify and recruit talented AI professionals, driving further innovation in the field and even having the potential to simplify complex tasks such as AIOps and MLOps in existing data management processes.

At the same time, we recommend companies start scanning the horizon for purpose-built start-ups and services aimed at helping large and even regulated companies better govern the use of AI, especially with generative AI built on open-source and open-data foundations. Enterprise security risk management frameworks will have to urgently be updated to address data security risks and in decision ethics, that will have profound implications to organisations, both short and long term.

It is no surprise that cybersecurity operations remain a top priority among tech leaders, as supply chains grow and become more deeply embedded with each other. The challenge most tech leaders encounter is that cybersecurity investments are never enough, and with limited resources, talent and budgets, organisations have to get really good at prioritising the top digital risks to be addressed and to build adequate response mechanisms in the event that a cyber breach does occur.

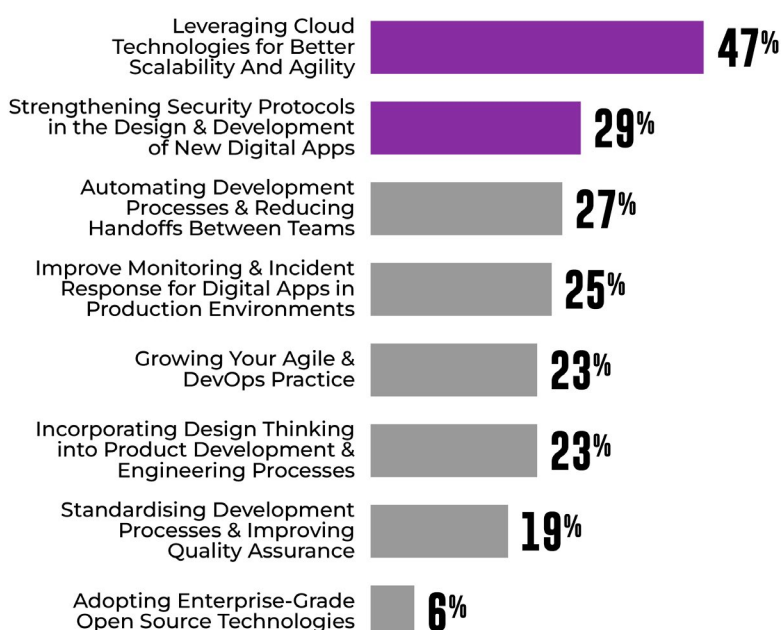
To balance the competing needs of digital transformation with limited financial and human resources in a large and complex organisation can be daunting, especially in today's contractionary economic climate. Pressures on IT teams to cut costs and find efficiencies on the back of massive efforts made during the pandemic to quickly spin-up and maintain digital services are running much higher in 2023 compared with previous years. To help manage and optimise digital investments, the Technology Business Management (TBM) framework, which helps organisations align their technology investments with their business objectives, enables organisations to

track and manage their technology spend, understand the cost and value of their technology investments. Coupled with proper Enterprise Architecture (EA), tech leaders are better equipped to streamline business processes, deploy technologies where it returns the most value and ensure that their technology investments are scalable, secure and compliant.

Section 3: Top Digital Engineering Strategies

Cloud, cloud and the cloud. Companies can't get enough of the wonders of what Cloud technologies can bring. According to the survey responses, leveraging cloud technologies for better scalability and agility is the top digital engineering strategy. Cloud technologies have become essential for modern businesses, as they enable organisations to quickly scale up or down their infrastructure to meet changing demands. Furthermore, leading cloud providers have built robust cybersecurity capabilities to protect mission-critical workloads, data and applications, far better than what individual infrastructure teams can achieve, compared with the global scale of hyperscalers.

TOP 2 DIGITAL ENGINEERING STRATEGIES



Companies are increasingly adopting multi-cloud operating models to improve their digital services and better manage their data. This approach involves using a combination of cloud providers to manage different workloads, applications and data across a distributed infrastructure. Multi-cloud brings great benefits, including increased flexibility, scalability, cost savings and better risk management. With multiple cloud providers, companies can avoid vendor lock-in, leverage the strengths of different providers and reduce the risk of service outages.

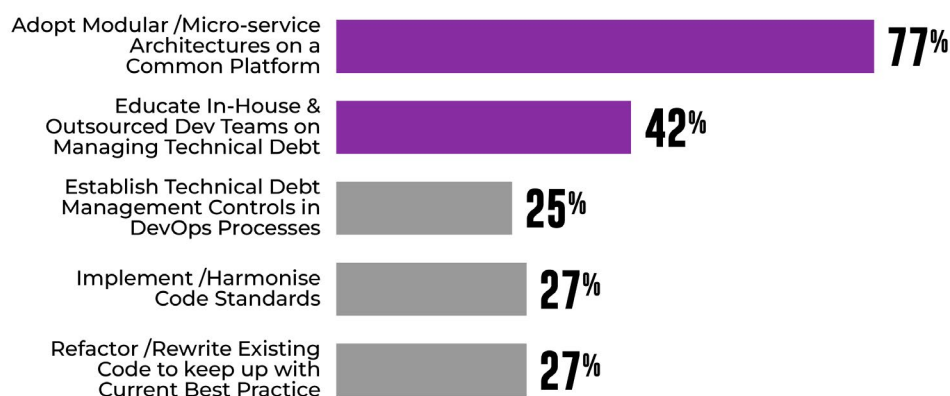
However, this strategy also presents challenges such as complexity, security gaps, interoperability issues and potential duplication of effort. To optimise multi-cloud operations, tech leaders need to focus on developing a cohesive strategy for workload placement, data management and governance, while also ensuring security and compliance across multiple providers. They should also invest in automation and monitoring tools to manage and orchestrate workloads across multiple clouds and leverage cloud-native technologies to simplify and streamline operations. Managing multiple clouds requires careful planning, investment and execution, to maximise the benefits and minimise the risks.

The cloud also enables tech teams to refresh legacy applications and develop new ones using agile frameworks and DevOps practices. Tech teams have built modular, micro-service oriented

architectures, with containerisation being a leading strategy. The Kubernetes, Docker, and Istio combination has become the most popular container orchestration platform, with over 87% of Fortune 500 companies using variations of it. Tech leaders must carefully manage the interdependencies between services and ensure consistent deployment and management practices. Additionally, security and governance become increasingly important as services are broken down into smaller components.

By automating development processes, organisations can streamline their software delivery pipeline, reduce errors and improve collaboration between development and operations teams. Meeting service reliability standards is a key performance target for engineering teams when deploying new code into Continuous Integration, Continuous Deployment (CI/CD) pipelines, spawning a renewed focus on enterprise architecture and site reliability engineering. However, implementing robust EA and SRE processes become complex in a hybrid, on-premise and multi-cloud operating environment. To keep up with business demands, automating development processes and reducing handoffs between teams help improve efficiency and reduce errors in the software development process. By automating development processes, organisations can speed up their software development cycle and reduce the time it takes to bring new products to market.

TOP 2 STRATEGIES TO FUTURE-PROOF DIGITAL APPS & SERVICES



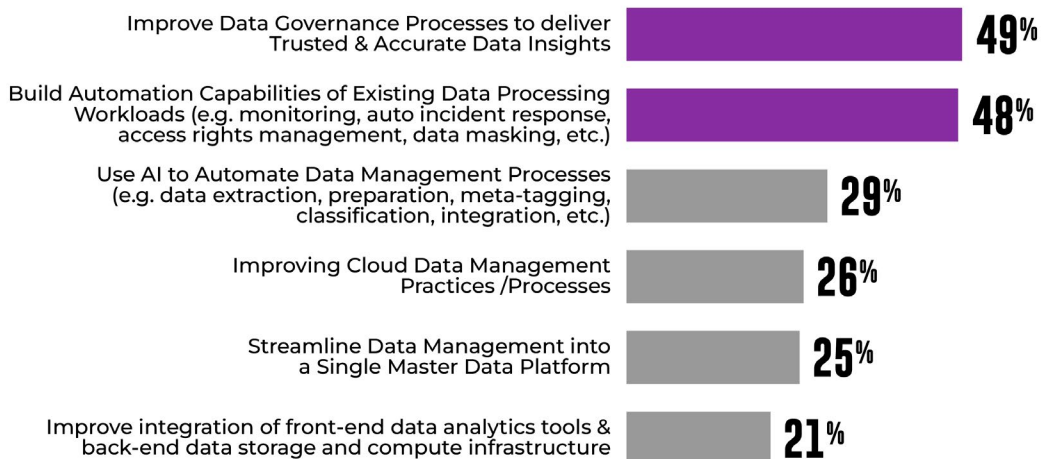
Establishing technical debt management controls in DevOps processes was selected by 25.4% of respondents as a key strategy for future-proofing digital apps and services. This approach involves incorporating technical debt management controls into the DevOps processes to enable more efficient and effective management of technical debt. 42.5% of respondents have also indicated that educating their in-house and outsourced development teams on managing technical debt. This approach involves developing a better understanding of technical debt and implementing processes to manage it effectively. By addressing technical debt, organisations can reduce risks, improve system stability and enhance the quality of their digital products and services.

In conclusion, developing on the cloud is complex, SRE teams should work closely with DevOps teams by sharing their knowledge of software development and managing infrastructure to make recommendations around best practices and they can also assist directly with code management and monitoring to help improve DevOps applications. SREs can further reduce the communication gap between dev and operations teams, improving the overall infrastructure.

Section 4: Top Challenges and Priorities in Data Engineering

When it comes to data engineering priorities, the survey results indicate that the two most critical areas are improving data governance processes and building automation capabilities for existing data processing workloads. While the amount of data that organisations are generating is increasing exponentially along with growing complexities of managing and securing data at rest and in motion, nation states in Southeast Asia have tightened regulations around data privacy and data sovereignty, imposing harsher penalties and even criminal charges should organisations not comply or suffer a data breach as a result.

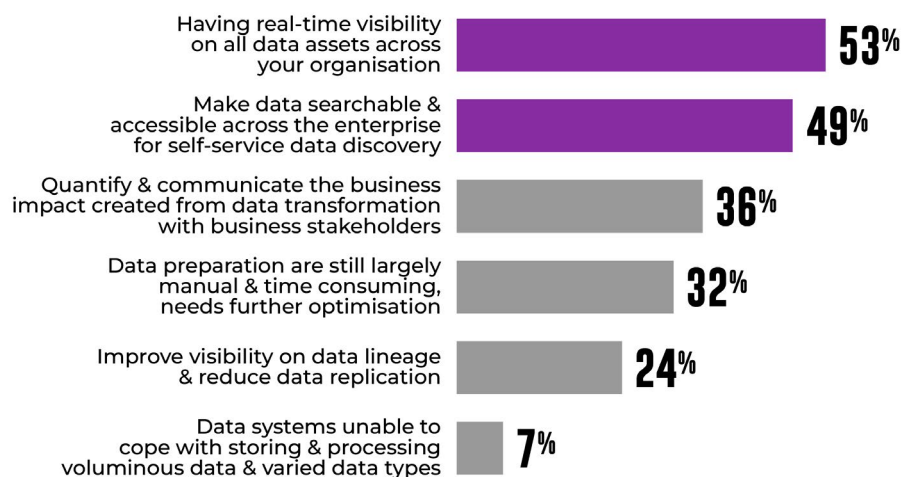
TOP 2 DATA ENGINEERING PRIORITIES



Top on the priorities list for data teams to improve data governance is the need to ensure the accuracy and trustworthiness of data. Limited tools, however, can provide data leaders with accurate visibility on the data assets across the enterprise, let alone provide data lineage or replication history. This leads to challenges for compliance to personal data protection laws and for organisations with business operations in Europe, compliance to the General Data Protection Regulation (GDPR) remains a challenge. Organisations have started to centralise data management across the enterprise through initiatives such as master data management (MDM) to develop consistency in data governance policies across the organisation and build some sense of a single source of truth. This way, data teams can safely conduct analytics operations while remaining compliant to prevailing data protection laws.

Analytics is also no-longer a good to have, but in recent years, have been deeply embedded into core business operations such as fraud prevention, online payments and customer onboarding

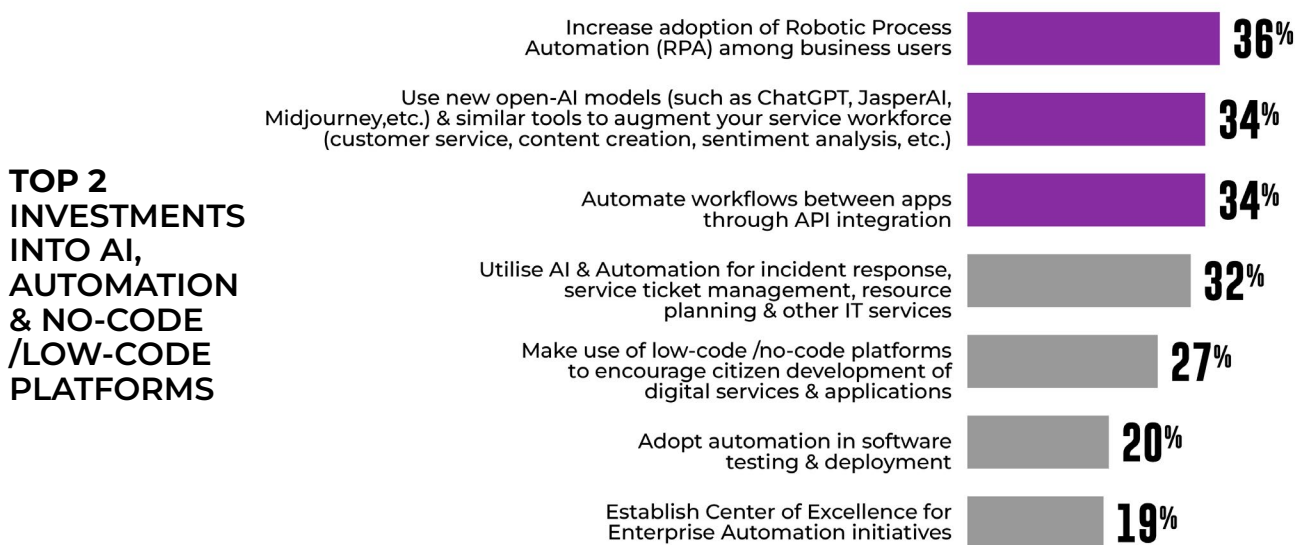
TOP 2 DATA MANAGEMENT CHALLENGES OF RESPONDENTS' ORGANISATION



workflows such as Know-Your-Customer (KYC) processes. Data services today have to meet the same service reliability standards as the mission-critical digital services. To ensure that data services remain “always-on”, data teams are building automation capabilities both into the collection, preparation and delivery process, but also building self-regulatory and auto-healing capabilities into the production environments that support critical data workloads.

In today’s new age of generative AI, it is without a shadow of a doubt that AI is now cloud native and so will the data management processes that support the future of AI. Tech leaders have to invest into Improving cloud data management practices to fully optimise the scalability and flexibility offered by cloud capabilities. A recent Accenture study showed that organisations that adopt cloud-based data management solutions see an average increase in revenue of 10% and a decrease in operating costs of 20%. This has caveats, poor data classification on the cloud, the lack of storage tiering and unnecessary replication are the top reasons that send the cloud bill soaring at the end of the year, without realising any of the intended cost savings. The use of cloud-based data management tools such as data virtualisation, data mesh, data fabric, all bring with it pros and cons, tech leaders must decide carefully on the best ways to organise data that delivers the maximum business value for their organisations.

Section 5: Enabling Citizen Development, Developing the Digital Knowledge Worker



Augmenting the workforce with intelligent, yet easy to use productivity tools, is key for organisations to effectively address the bifurcation of routine tasks viz-a-viz knowledge tasks. On one side you have ideation and creative applications in any field and on the other side, there exists routine tasks that form part of complex business workflows, that while essential, are repetitive in nature that workers wish they could automate away. Knowledge workers can unlock massive productivity gains, by using robotic process automation (RPA) on repetitive tasks and make use of generative-AI models such as ChatGPT, MidJourney, Beautiful.ai, and other AI enabled creative tools to increase work quality and realise significant time savings.

One notable organisation in the healthcare industry leveraged AI and natural language processing to automate its customer service chatbot, resulting in a 70% reduction in customer service response times and a 20% increase in customer satisfaction. A technology firm successfully automated its workflows through API integration, leading to a 30% reduction in manual effort and a 50% improvement in data accuracy.

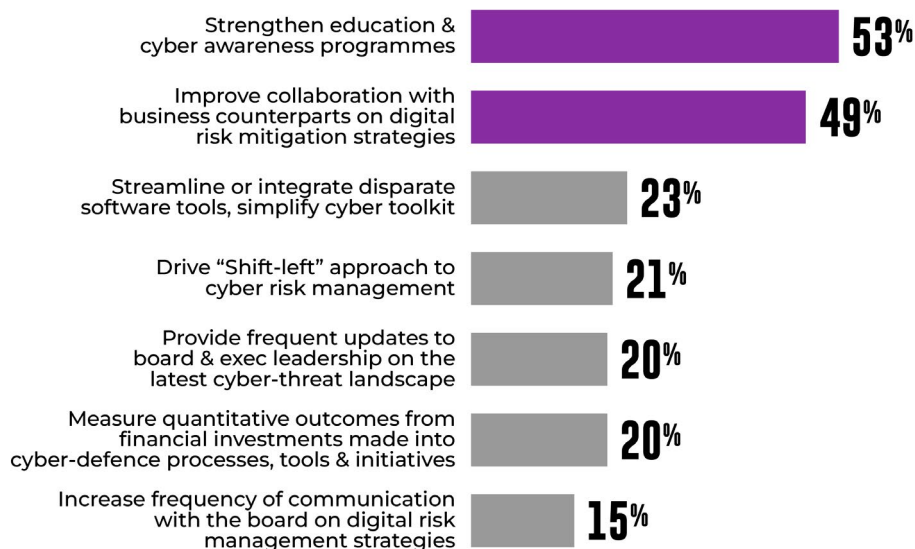
Generative AI is also beginning to embed into enterprise processes, including RPA, IT service management and other operations such as customer service, content creation, and customer intelligence gathering. AI has not only demonstrated to make the average knowledge more productive, but the human-machine intelligence could realise increased customer satisfaction and drive better revenue outcomes as well.

However, there are also challenges associated with the adoption of automation in software testing and deployment. For example, the implementation of automated testing requires significant upfront investment in terms of time, resources and expertise. There may also be resistance from certain stakeholders who are not familiar with automated testing or who fear that automation will lead to job loss. Moreover, there exist a unique set of moral risks in using RPA to approve certain workflows - such as trade documents in banking services that may apply too rigid a criteria where there is a need for a more tailored approach to client management.

To overcome these challenges, tech leaders can develop a comprehensive plan for automation that addresses the concerns of all stakeholders and highlights the benefits of automation. This may include conducting pilot projects to demonstrate the effectiveness of automated testing, providing training and support to staff and involving employees in the design and implementation of automation initiatives. There is potentially even greater benefit in field-testing these efforts together with clients to better understand how the systems can work cross-functionally and across organisations in the supply chain to better augment workflows and deliver even greater productivity.

Section 6: Managing Digital Risk

TOP 2 DIGITAL RISK MANAGEMENT PRIORITIES

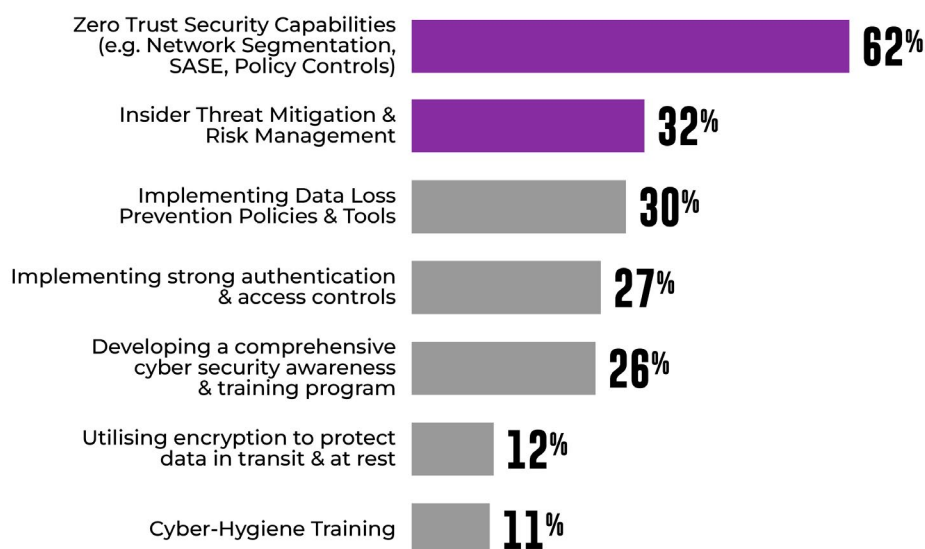


Organisations in the Southeast Asia region have some ways to go in strengthening cyber-awareness both within the board leadership as well as within the workforce, human insiders remain the biggest threat and weakest link to cyber defence in organisations today. Often, good cyber hygiene is enough to seal off the majority of ingress opportunities available to infiltrators. One CISO we interviewed highlighted "the best way to reduce dwell time is to not have it in the first place". As such, improving collaboration with business counterparts on digital risk mitigation strategies was identified as the top priority by nearly half of the respondents. This reflects the recognition that managing digital risks requires a coordinated effort across different functions. For instance, banks and financial services firms have been

investing heavily in collaborative platforms that enable real-time sharing of threat intelligence and risk assessments between different departments and external partners and supply chain vendors.

How do attackers always stay one step ahead of us despite billions of investments made already into sophisticated monitoring and defence tools? Attackers work in tightly coordinated groups to target the world's biggest companies. It is high time the industry adopts the view that the enemy of my enemy is my friend. Organisations urgently need to collaborate by sharing threat intelligence, the Tactics, Techniques and Procedures (TTPs) and observations of attack indicators observed in their networks. This is an imperative first step toward active cyber-defence. Singapore based government linked investment holding company, Temasek, has developed a shared security services model not only for its parent holding company, but also develop a common platform for collective defence across its portfolio companies. To better optimise cyber defence for a collective group of invested companies, Temasek also established ISTARI, a global cybersecurity company intended to address the collective cyber-defence needs of its portfolio companies, that today has expanded its range of services beyond the Temasek portfolio.

TOP 2 CYBER DEFENCE & PREVENTION PRIORITIES



The increasing reliance on digital technologies, cloud infrastructure and Software-as-a-service (SaaS), coupled with remote work has led to a much wider attack surface. How are cyber teams able to keep up with new threats and address new vulnerabilities? All cyber attacks start and end from the endpoint, but defence and remediation mechanisms in between will determine if organisations suffer severe data theft and disruption of services, or remediate and recover quickly.

Endpoint devices and network infrastructure are prime targets for cybercriminals seeking to exploit vulnerabilities and gain access to sensitive data. Chief Cybersecurity Officers (CISOs) are familiar with popular metrics such as the Mean Time To Detect (MTTD) and Mean Time To Respond (MTTR) and dwell time. In between that, CISOs are paying more attention to Breakout time, which describes the time it takes for an attacker to gain initial access, scan the local network, deploy exploits and begin moving laterally throughout the environment. According to the 2022 Global Threat Report from CrowdStrike the average breakout time was 1 hour and 38 minutes. A previous 2019 CrowdStrike report broke this down by threat actor groups as follows:

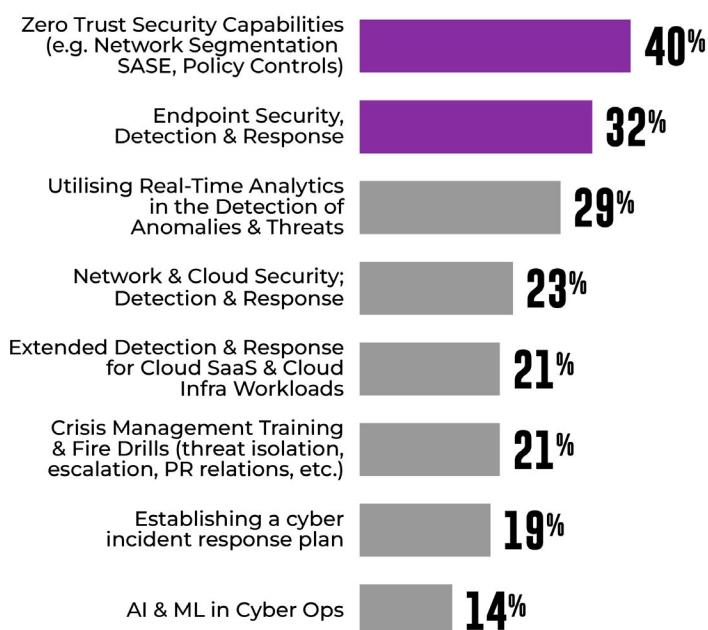
- Cybercrime gangs – 9 hours and 42 minutes
- Iranian-sponsored threat groups – 5 hours and 9 minutes
- Chinese-sponsored threat groups – 4 hours
- North Korean-sponsored threat groups – 2 hours and 20 minutes
- Russian-sponsored threat groups – 18 minutes and 49 seconds

Even with a breakout time of nearly 10 hours and using the M-Trends data, attackers will have compromised environments and moved laterally through it for over 27 days before they are detected. In other words, over 98% of the time between initial compromise and detection occurs after the attacker has begun moving throughout the environment. This significantly affects response times, as breaches spread quickly like a cancer when end points and networks are not isolated during extended dwell time. In light of these sobering data points, **we recommend CISOs focus on 3 areas of next-gen cyber operations.**

- Network Segmentation and Isolation (a key feature of the well known Zero-Trust approach that has seen progress in adoption in organisations)
- Policy based contextual access management and dynamic key and credentials (another key zero trust concept), extending beyond user to machine/app access, into app to app, app to machine and machine to machine access.
- Extend detection and response capabilities beyond the firewall perimeter both into cloud edge environments and within the firewall network

While organisations have adopted advanced Endpoint Detection and Remediation (EDR), EDR has its limitations as well. Insider threats such as a compromised insider with trusted access rights, or the malicious use of compromised (stolen) login credentials leave no breadcrumbs even for the best EDR tool on the market to detect. To better detect and isolate malicious activities executed through compromised insiders, organisations have to extend telemetry monitoring and data packet traffic monitoring within the network perimeter through the use of Network Detection and Response (NDR) tools as well as Cloud Detection and Response tools. These tools use advanced AI and machine learning to study network and edge telemetry between user to user, app to app, machine to machine, and everything in between. These technologies will be able to detect anomalous behaviours and suspicious traffic patterns even between trusted users, apps and machines.

TOP 2 CYBER DETECTION, RESPONSE & REMEDIATION PRIORITIES



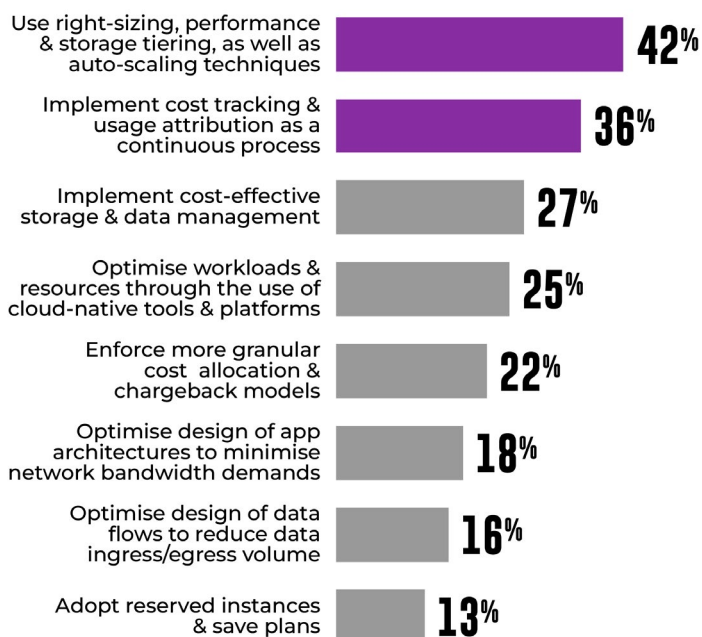
While several organisations have begun embarking on enterprise-wide Zero-Trust Network Access or similar policy-based network segmentation journeys, many face challenges in keeping their access policies updated. Another constant challenge faced by organisations in implementing zero trust security and insider threat mitigation is the complexity of modern IT environments. There is a lack of adequate intelligence from network telemetry and user access logs for security teams to identify potential vulnerabilities and weaknesses. Network segmentation is a central component in any zero-trust framework today and to keep policies updated at near real-time, requires some nifty intelligence provided by NDR telemetry analytics as well as cloud-native access management engines, which can detect lapses in existing user access management policies and decayed credentials that require urgent refresh. This way, policy teams can keep up with ongoing changes in their digital assets and operating environment.

Though the integration of Zero-Trust capabilities with advanced AI and ML provided by XDR tool suites have the potential to significantly widen the defence moat between organisations and attackers, these capabilities are still very much fragmented across the cybersecurity solutions market, which in the last 2 years, have seen a spike in Merger and Acquisitions (M&A) driven by Private Equity deals seen most prominently in the US. Piecing together the “best-of-breed” capabilities takes an extraordinary amount of engineering talent and deep expertise in the cyber stack to architect. At the same time, organisations need to carefully balance the benefits of architecting their future cyber stacks with the cost and complexity of implementation, while being mindful of concentration risks and vendor lock-in when going for “best-of-suite” providers that offer all-in-one defence and response capabilities. Our recommendation is to explore cyber alliances that are readily available in the market today, as alliance partners tend to offer pre-built integration that will provide ease of management yet take full advantage of best-of-breed solutions while mitigating concentration risks.

Section 6: Cloud Financial Investment Management

With increasing regulatory barriers sprouting up, regional and global companies have begun experiencing greater and greater complexity when it comes to managing their data on the cloud. Often, complex data stores across on-premise and hybrid cloud solutions, meeting compliance

TOP 2 PRIORITIES TO OPTIMISE ONGOING FINANCIAL INVESTMENTS INTO CLOUD INFRASTRUCTURE & PLATFORMS



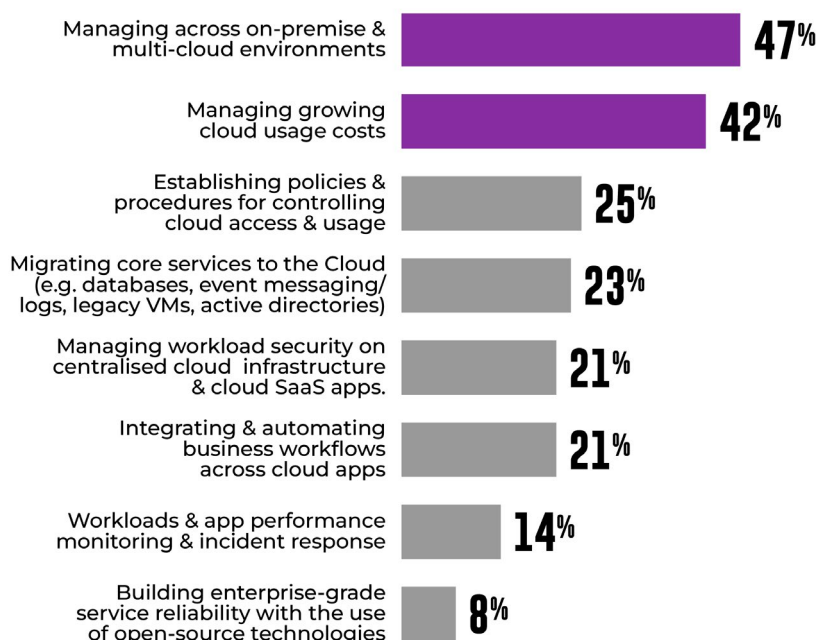
standards on the special treatment of personal data with the rise of data sovereignty laws and navigating a maze of new and legacy data pipes can be overwhelming even for experienced data leaders.

While smaller organisations may limit themselves to the employment of a few key cloud service providers, this is often not a sustainable strategy for larger organisations because of the need for distributed business continuity in the event of unplanned infrastructure downtime. Additionally, one of the primary reasons for this challenge is the use of different cloud providers for various purposes, such as using AWS for storage and Google Cloud for analytics or other cloud providers where key microservices are required. This means that companies need to manage different tools and platforms that are unique to each cloud provider. Additionally, some companies may have legacy systems that are still running on-premise, making it even more challenging to manage and maintain.

With the benefits that Cloud provide, Interviews with industry experts suggest that organisations need to take a holistic approach to optimising their ongoing financial investments into cloud infrastructure and platforms. This includes adopting a cloud governance framework that enables organisations to manage their cloud environments effectively and optimise their ongoing financial investments. It also includes investing in cloud cost management tools and leveraging cloud-native tools and platforms to optimise workloads and resources.

A major financial institution is among a rising number of organisations in Asia that successfully implemented a multi-cloud management platform, allowing them to manage their IT infrastructure across multiple cloud providers through a single user interface. This has helped them to maintain data consistency, control costs and improve overall security. Additionally, the use of cloud agnostic automation and orchestration tools has helped them to streamline their workflows and reduce manual intervention, allowing them to focus on other important tasks

TOP 2 BIGGEST CLOUD MANAGEMENT CHALLENGES



Another major challenge for companies is managing the growing costs associated with cloud usage. While cloud services can offer numerous benefits, such as scalability and flexibility, they can also be costly, especially as usage increases without the right policy controls and transparent charge-back models. The key consideration our respondents' have is around establishing policies and procedures for controlling cloud access and assigning admin rights as well as utility optimising

controls for spinning up new instances, microservices or data storage buckets.

Tech leaders have only figured out in recent years proven engineering approaches to optimise performance per dollar cost investment and quantify business outcomes from cloud investments. In Asia, frameworks such as these recommended by the FinOps Foundation for financial management of Cloud are barely in its nascency. Cloud providers are competing fiercely to enhance their offering baskets and drive greater value to customers, while embracing the new reality that customers will hedge cloud exposure by adopting a fit for purpose, multi-cloud approach in the long term.

Respondents' have placed a strong focus in this year's survey on implementing both cost tracking and cost attribution for cloud as a continuous process, while building in-house capabilities to automate right-sizing, performance and storage tiering, as well as develop auto-scaling techniques to achieve the best of both cloud scalability while maximising cost efficiency.

In addition, organisations are adopting built-in-the-cloud tools and platforms to optimise workloads and resources. These tools and platforms work natively with cloud capabilities such as serverless computing, containerisation and other microservices, thereby proving to reduce significant friction compared with tools that were built for data-centre deployment and adapted for Cloud.

Section 7: Corporate Sustainability Management

In the last two years, ESG (Environmental, Social, and Governance) and sustainability have risen in importance across industries, driven by global goals such as the UN's Sustainable Development Goals. The IT sector has a significant role to play in achieving these goals and is prioritizing initiatives such as implementing real-time optimization strategies, improving traceability and transparency in supply chains, promoting responsible use of technology and extending sustainability requirements to third-party vendors. These efforts aim to embed sustainability into every aspect of IT operations and drive progress towards a more sustainable future.

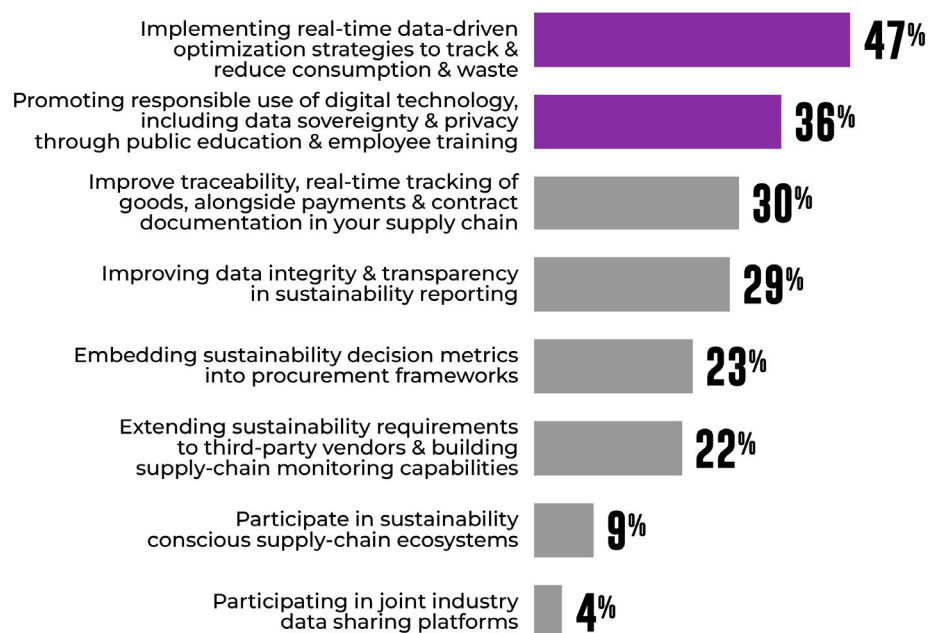
From our survey, respondents saw the need for near real-time data intelligence on day-to-day business operations both internally and externally as major priorities for their organisations and across their supply chain. External pressures and incentives such as new regulations, sustainability conscious customer demands, favourable financing terms contingent on the achievement of sustainability outcomes or investor pressure, hardly ever impact a single organisation, but entire industry ecosystems. Participating organisations need to report sustainability outcomes, supported by immutable data evidence and expect the same from their supply chain partners.

Most notably, today's consumers have become more savvy of their environmental impact, they are also demanding greater transparency up the value chain as part of their buying decision journey. This demand for transparency is putting pressure on organisations to implement effective traceability and tracking measures in their supply chains. Companies that are able to build sustainability conscious supply chains and communicate the value of their products to consumers will have the leading edge in capturing this segment of the market. Implementing these measures can be challenging as it requires close collaboration and data sharing between multiple stakeholders in the supply chain, even among competitors at times.

Overconsumption and waste reduction is another key development in digital transformation today. Digital technology such as data centres, servers and devices require energy to operate, which can contribute to carbon emissions and exacerbate climate change. At the same time, frequent disposal of electronic devices and equipment has been found to lead to a significant

amount of electronic waste. According to a report by the World Economic Forum, the production of electronic devices requires the use of valuable natural resources such as cobalt, copper and gold. The report also states that by 2050, electronic waste is projected to be the fastest-growing waste stream in the world.

TOP 2 PRIORITIES IN CORPORATE SUSTAINABILITY MANAGEMENT STRATEGY ACROSS THE SUPPLY CHAIN



Companies around Asia have begun adding sustainability compliance standards into procurement guidelines for IT, for example, ensuring that Cloud services are using sustainable data centres, with the best Power usage effectiveness (PUE) and use of renewable energy to power its computing resources.

With greater emphasis on efficiency and sustainable business practices, organisations are looking into ways to optimise their operations in a way that is both climate positive without necessarily increasing operating costs. This requires real-time data-driven optimization strategies that can track and monitor key metrics, such as energy usage and waste generation. Businesses have to first digitalise its processes, and for many, even in the Operational Technology (OT) space, to facilitate data collection and reporting.

Section 8: Talent and Skills Development

With the pace of technological progress, the need to upskill the workforce toward a digitally oriented one is an ongoing effort without which the organisation is put at serious risk of eroding competitiveness. Our survey amongst Asia's top technology leaders shows that the top digital skills training required fall into the realms of cybersecurity and digital risk management, data management and digital transformation strategy and change management. This should also imply that these areas are the most quickly progressing/ changing fields in today's digital landscape and will become future battlegrounds if not already.

Moreover, different organisations require different digital skills training needs depending on their industry, size, and stage of digital transformation. E-commerce companies are hiring talents in AI and data analytics in droves in a bid to build world-class customer intelligence and develop cutting edge capabilities especially in innovating new business models that motivate customers to share first party data, Financial Institutions are placing greater focus on risk, governance and cybersecurity professional skills to meet tightening regulatory demands yet

staying agile and resilient. Undergirding these tactical shifts is consistent board and leadership mindshare and change management programmes throughout the organisation to instil a mindset shift toward building a digital-first organisation.

We further note that tech leaders have not yet prioritised the development of professional talent in areas such as sustainability reporting and sustainability development. These talents will be in high demand this year and next. While few will have adequate working experience in niche areas such as sustainable IT, it is critical that IT organisations begin recruiting these talents early and develop training programmes to build capacity for the future.

Section 9: Conclusion

Asia's tech leaders should push ahead with their digital transformation plans to ensure organisational success for the long term. Post pandemic uncertainties will create new pressure points for organisations, increasing the demands for leaders to build agility and resilience across all areas of business, operations, people and technology. Our research shows that companies with strong digital leadership have the biggest advantage compared with their peers to succeed. Looking ahead, emerging technologies such as GenerativeAI and automation will be a force that will shape our future. Is this the 5th industrial revolution that will shift the paradigms for our knowledge workers today? Tech leaders will have to continue sharpening their skills in scanning the tech horizon for potential disruptors and weak signals. They are now in the driver's seat to help organisations navigate change in today's Volatile, Uncertain, Complex and Ambiguous (VUCA) world. We hope this research aids you in your strategic plans and engagements with peer leaders in your organisation.

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