

A photograph of a man holding a young child up to a tree branch. A pair of shoes is hanging from the branch. The scene is set outdoors with sunlight filtering through the leaves.

Technology Vision 2023 - Southeast Asia report

When Atoms meet Bits

The foundations of our new reality



Introduction

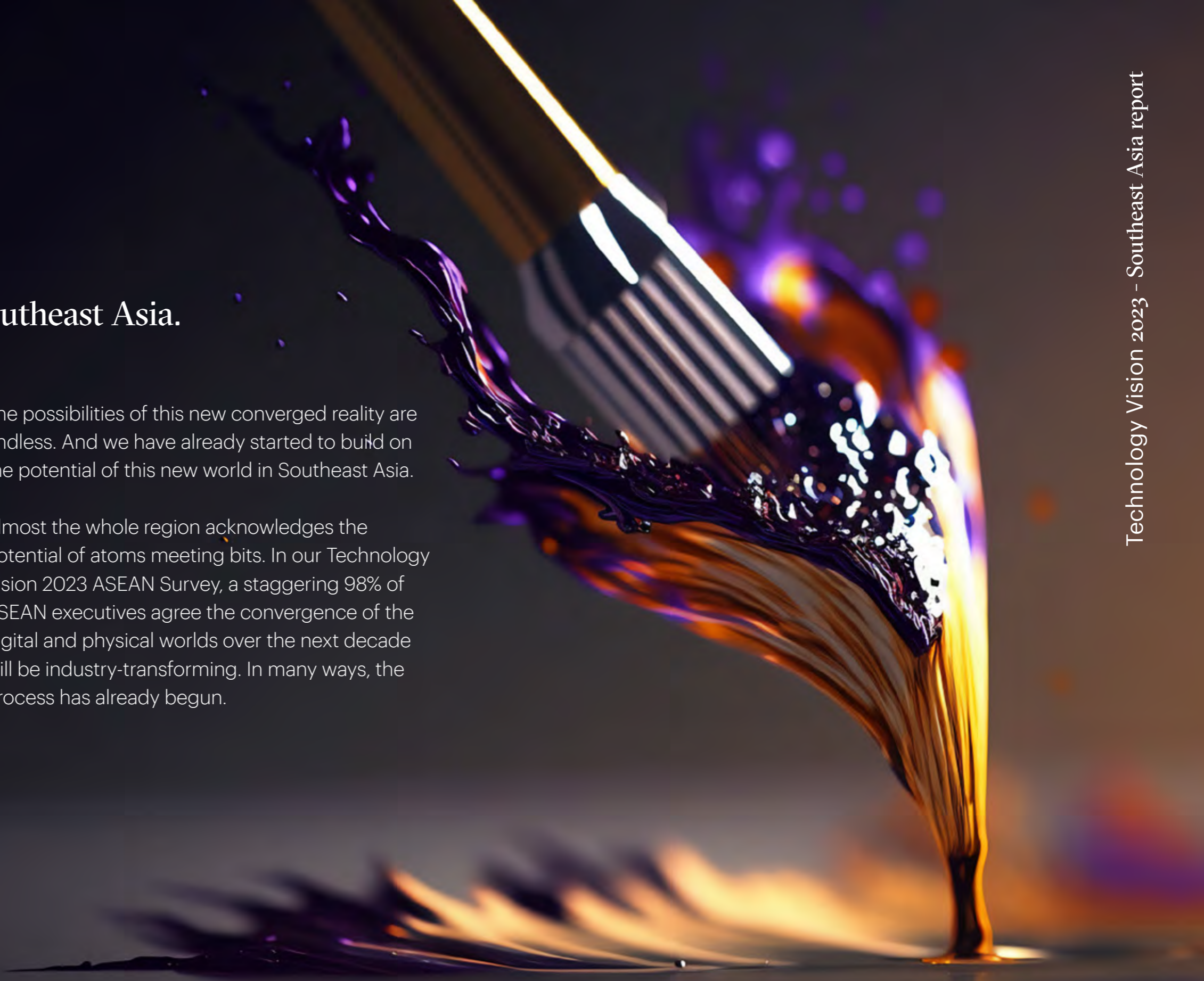
A new digital reality is dawning on Southeast Asia.

We are living in a digital world that has allowed family and friends to keep in touch virtually, connect and collaborate with colleagues across the world using technology tools, and facilitate remote transactions with e-commerce platforms. But our modes of interaction are still split distinctly into two – the physical and the virtual.

Not for long though. The two parallel realms are set to converge in a brave new world, as rapid advances in Web3, metaverse, AI and cloud technologies meld the physical and the virtual spheres together. As barriers continue to be broken down, a shared reality is coming to light; one in which our physical world of atoms and digital world of bits fully converges.

The possibilities of this new converged reality are endless. And we have already started to build on the potential of this new world in Southeast Asia.

Almost the whole region acknowledges the potential of atoms meeting bits. In our Technology Vision 2023 ASEAN Survey, a staggering 98% of ASEAN executives agree the convergence of the digital and physical worlds over the next decade will be industry-transforming. In many ways, the process has already begun.



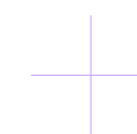
This year's Accenture Technology Vision 2023 – Southeast Asia report explores the technology trends driving this new reality, and the steps enterprises will need to take to thrive in it.

The arrival of digital identities has unleashed a world of convenience never seen before. In Singapore, the digital identity platform Singpass has revolutionized the way people buy property, pay taxes and even open bank accounts. The tedious era of form-filling and in-person applications is over, with a single password all that is required to access thousands of public and private sector e-services.

The wealth of transparent data has led organizations to also become more agile, even to the point of using it as a forecasting tool. Now, they can predict rather than react to demand and supply more quickly. Thailand's Siam Commercial Bank, for instance, has started to automate daily forecasts for ATM cash management, and used the data to optimize cash levels in ATMs.

Generative Artificial Intelligence (AI) is a strong contender to be the buzzword of 2023, with the technology bursting onto the scene and astonishing the world with its capabilities. Organizations across Southeast Asia see the potential and are now looking to capitalize on it. GreatGOV GPT – an AI tool for public policy writing – may soon assist civil servants in the Philippines to generate public policy papers.

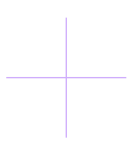
As the science-technology feedback loop continues to accelerate at lightning speed, innovations are being churned out at an unprecedented pace, allowing us to build new frontiers in many sectors. Look at the world of healthcare, where scientists in Singapore have developed a diagnostic tool powered by AI that improves the accuracy of electrocardiograms (ECG) by up to 98.5%. This was only made possible by harnessing a machine-learning algorithm that allowed the AI tool to learn from massive volumes of past ECG data.



98%

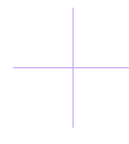
of ASEAN executives agree that the convergence of the digital and physical worlds over the next decade will transform their industry.





To thrive in this new world, leaders must prepare their organizations where the physical and digital becomes seamless. The path to total reinvention begins here.

These examples illustrate ways in which our physical and digital realities are starting to fuse. Each case shows us how the fusion of digital and physical is rewriting how the world works. We're not simply talking about new kinds of products and services – we are creating a new set of tools to bring truly new possibilities to life.



This is a continuation of the meteoric development of our digital capabilities. If you look back at last year's Technology Vision report, we called out the Metaverse Continuum as the next big step after digital transformation. We defined it as a spectrum of digitally enhanced worlds, ranging from the fully digital to a blend of digital and physical. We also explored how it will transform everything, ranging from the environments where people spend their time in, to how work gets done.

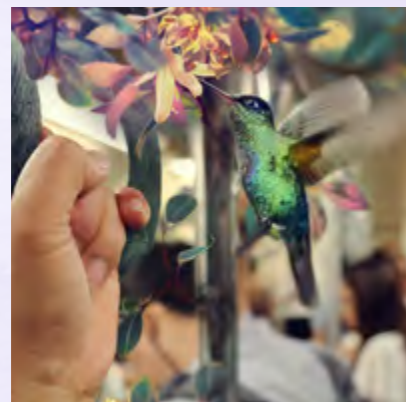
The next great technological era has arrived in Southeast Asia. A new reality, one that fuses both physical and virtual, is inevitable. To thrive in this new world, leaders must prepare their organizations where the physical and digital becomes seamless. The path to total reinvention begins here.

Our Four Technology Trends for 2023

Digital identity

A seamless convergence of the physical and digital

Digital identity is quietly becoming the key to enterprises' technology aspirations, and efforts to reimagine it are underway—not just for people but for all things.



Your data, my data, our data

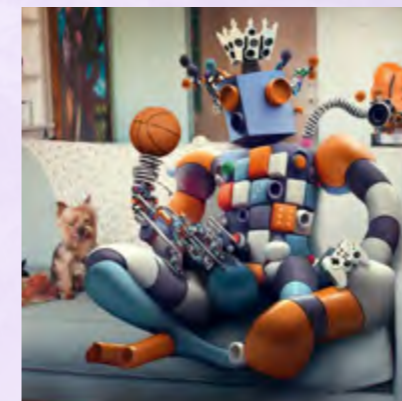
Unlocking the limitless potential of transparent data

Data ecosystems are being reshaped by radical transparency as enterprises leverage their troves of data to offer unprecedented insight into their business.

Generalizing AI

Shaking up the world with generative AI

Foundation models are driving one of the biggest step changes in AI history. Now, enterprise leaders can shift from building their own AI to building *with* AI.



Our forever frontier

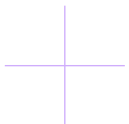
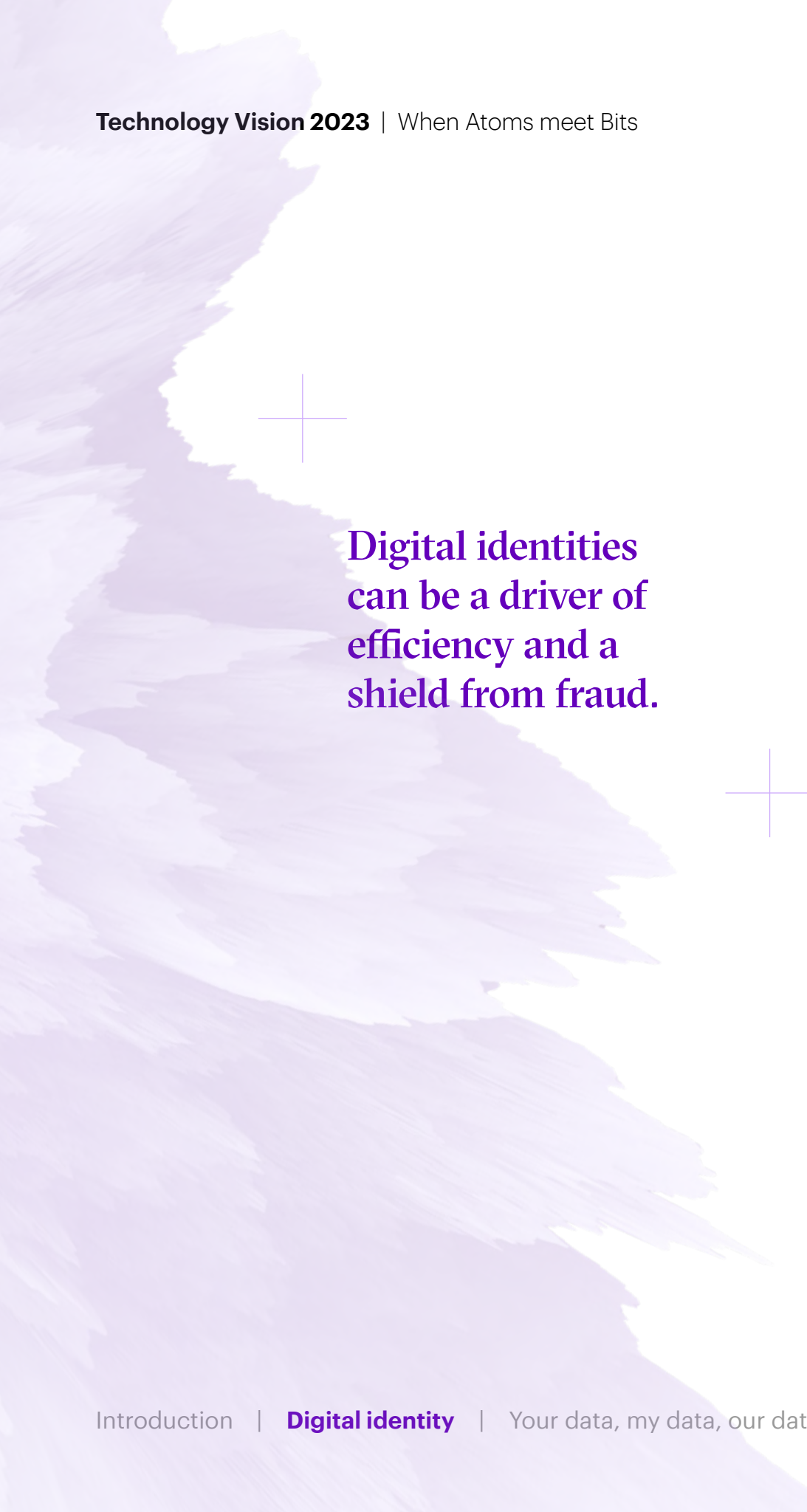
The big bang of computing and science

After decades of hyper focus on digital technology, science is leaping back to the top of enterprises' agendas.



Digital identity

A seamless convergence of the physical and digital



**Digital identities
can be a driver of
efficiency and a
shield from fraud.**



In 2003, as the digital revolution gained global momentum, the Singapore government launched Singpass, a digital identity platform that ushered in an unparalleled era of convenience and security.

With just one password, the one-stop portal unlocked the key to over 2,000 government and private sector e-services. Boasting a user base of over 4.5 million and covering 97 percent of residents, Singpass is one of the most widely adopted national digital identity systems in the world today. From buying property to paying taxes, more than 350 million personal and corporate transactions are carried out on the platform annually.¹

This is the power that a digital identity – as a driver of efficiency and a shield from fraud – holds. And as the boundaries between the digital and physical worlds converge, digital identities will be firmly at the centre of the next wave of business disruptions.

By 2027, the market size for global digital identity solutions is estimated to grow to US\$70.7 billion.² ASEAN enterprises are aware of the potential digital identities bring, with 93% of ASEAN executives in our survey agreeing that digital identity is becoming a strategic business imperative for their organizations.

Today's digital world means that the lack of seamless, accurate online verification will hamper businesses. Digital identities tackle this problem directly, making the technology a clear necessity. Organizations in Southeast Asia need to grasp the full scale and speed of how identity is changing our digital and physical landscapes. If left unaddressed, they will find themselves playing catch-up to a future that they may find themselves unprepared for.

Launching a new wave of economic growth

Southeast Asia is no stranger to digital identities, with most countries in the region having already launched some form of digital identities for their citizens.



Thailand, for instance, has rolled out three digital ID platforms. Tying everything together is the National Digital Identity (NDID) platform. The country's main digital infrastructure looking to build new creative services and businesses in the digital economy. Launched as a public-private initiative, NDID aims to reach 10 million digital IDs by the end of 2023.³

Complementing the NDID is the Mobile Network ID, which links citizens' ID information with their mobile numbers, allowing them to access e-services using their phones. Completing the trio is ThaiID, which is the government's effort to digitalize national IDs countrywide. For instance, Thai citizens can now board domestic flights by simply showing their digital ID on a mobile application.

A US\$250 million investment from the World Bank in 2023 has bolstered Indonesia's digital identity ambitions, which will increase the use of biometric digital identification. With the country boasting the fourth highest number of Internet users in the world, enabling digital identities will optimize its massive digital potential and strengthen inclusivity, especially

in more rural provinces. As of September 2022, there have been more than 7 billion real-time verification requests for digital transactions within the system.⁴

Neighbouring Malaysia's MyDigital ID initiative is in progress, with the country aiming to implement a biometric digital identification system by 2024.⁵ Efforts to achieve this goal are well underway, with 90% of government services already online. Users will get access to a digital ecosystem comprising the likes of business financial services to healthcare and education.

The private sector is also cognizant of the benefits a strong digital identity brings, with some leading the digital charge in tandem with the governments. Thailand's financial institutions, such as the Siam Commercial Bank and Bangkok Bank, have facilitated the ability of citizens to access an array of financial services through the NDID platform. They can now open accounts, apply for loans and conduct online transactions without having to provide paperwork in-person.





In Singapore, Singpass is already a key enabler for the government's online services. But the usage of digital identities is also growing in the private sector, especially in the financial industry. For instance, financial institutions such as Syfe, an investment platform, utilizes Singpass' application programming interfaces (APIs) to provide superior customer experiences. The company utilizes MyInfo – a Singpass feature that automatically completes digital forms with the personal data of users, eliminating the need for tedious uploading of identity documents. This has bolstered customer experience and optimized efficiency.

Indeed, businesses have a critical role in promulgating the usage of digital identities, by driving adoption of the technology across every facet of our digital lives.

Corporates can also benefit from having digital identities too, which will provide a single, reliable source of authorization for employees – depending on their approval and access – to transact with the likes of clients and governments. This will deter fraud and smoothen transactions. For instance, CorpPass,

Singapore's corporate digital identity, is now being used by more than 550,000 businesses to conduct transactions across more than 130 e-services.⁶

Being able to set up businesses, make monetary transactions, and manage investments have been made easier with the capability to seamlessly verify credentials with the use of a trusted digital ID infrastructure. As atoms meet bits, this merging of physical and digital identities will unlock new ways in how we live.

But organizations will also have to rethink the relationship between identity and data, as privacy laws over storage and usage of confidential data kick in. A new secure digital identity will redraw the parameters on how enterprises should and must adapt to secure their customers' information. The challenge now is to ensure security and enforce trust, as businesses look to improve the quality of digital identities.

Building a digital identity system for everyone

While the public sector often takes the lead in setting up digital identity platforms, this approach does not apply across the region because of the digital disparity between and within Southeast Asian countries.

This makes an ecosystem approach to building digital identities a far more sustainable effort. Organizations should not be thinking about building digital identities in siloes, but working with partners across the spectrum and promoting a plug-and-play approach. Partnership, rather than competition, is the priority here, with 68% of ASEAN organizations' indicating that they preferred partnership-led solutions. An ecosystem allows processes to be streamlined across multiple organizations, while allowing credentials to be kept and shared within a trusted group. This provides huge value for efficiency and security.

In today's global world, identities must also traverse borders to facilitate international trade and exchanges. ASEAN recognizes this, and is prioritizing the establishment of mutually recognizable digital identity platforms in its ASEAN Digital Masterplan 2025.⁷

Already, the central banks of Indonesia, Malaysia, Philippines, Singapore and Thailand have agreed to boost cross-border payments that will deepen regional and economic integration.⁸ An interoperable digital identity will be key to this success, helping facilitate transactions between countries.



68%

of ASEAN organizations' indicate that they preferred partnership-led solutions.

The arrival of the metaverse

The arrival of the metaverse is now opening a new chapter of decentralization.



Standardization aside, organizations and governments must also consider the best way to build a digital identity ecosystem. In ASEAN, high levels of trust between institutions and users have led to a centralized approach being the preferred choice in ASEAN, with 83% of executives leaning towards it. The system is easier to deploy and can be built for purpose.

But the evolution of the Internet may change this. The arrival of the metaverse is now opening a new chapter of decentralization. This user-led movement, which emphasizes digital ownership and transparency with Web3 technologies, is giving rise to a world of assets and services never thought possible before.

Thailand's NDID is an example of a platform that was built on a decentralized ledger, based on blockchain technology. This means greater transparency as all transactions can be traced and tracked. And as

no single authority is allowed to intervene, this also facilitates greater trust in the system.

The metaverse can also take industries to the next level by harnessing the likes of Augmented Reality and digital twins. By turning industrial systems virtual, these digital simulations can help organizations predict business outcomes in a cost-effective and secure manner.

While there are plenty of opportunities, issues also need to be addressed. Chief among which is safety and privacy. Advancements in deep fake technologies and sophisticated social engineering have increased the risk of fraud, hacking, and malicious behaviour.

With a focus on confidential computing, the concept of identity in the metaverse will also be even more complex. A preference for individual anonymity will make proving identities and building trust a challenge in these virtual societies.

Then there is also the issue of regulations. In an online world where users take sole ownership of their identities, how will data be governed? What are the common standards to follow? Providing greater control over a user's data, while also providing the means to safely transact, is a fine balance that requires re-education and training in using these new Web3 tools.



The industry is already working on the answers. For instance, a decentralized approach can be complemented with the use of digital wallets, allowing users to store their verifiable credentials that only they have control access to. They use this to prove who they are, while also being able to maintain anonymity.

This is what decentralized identity solutions provider Affinidi is doing, by creating a trusted digital credentials ecosystem that empowers businesses and individuals to securely exchange data and services.

Its digital identity wallet, for instance, allows users to store, share and manage their banking and alternative data from third party platforms as a set of verifiable credentials. With consent, this shared data provides banks with a holistic overview of their customers, which can be used to develop hyperpersonalized services.

Affinidi's solutions are also supporting the workforce in the Philippines through a collaboration with digital identity platform FilPass, which allows organizations to easily access and verify credentials of their job applicants, removing the need for hard copies and reducing fraud. This helps employers hire with greater assurance.

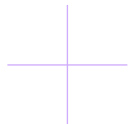
This also illustrates how the likes of national digital identity programs, regulations and Web3 innovators will play a major role in creating the governance and infrastructure needed to establish a safe, decentralized ecosystem.

Another innovator looking to safeguard digital identities is Singapore-based cybersecurity company V-Key.⁹ V-OS – their flagship technology – shields mobile applications and sensitive data from cyber threats like hacking, fraud, and data breaches by creating an isolated environment. It means that even if the host operating system is hacked, data in the V-OS remains protected. Backed by digital identities, this method of secure authentication has protected bank users from the likes of OCBC, UOB, and DBS.


The company is also developing a Digital Trust Platform, where companies across multiple industries can build a range of digital identity services that provide secure transactions across the entire value chain.

The merging of the physical and the virtual will require us to think harder about what it means to identify ourselves. It is no longer enough to have a piece of paper or a card to show that we are who we claim to be. Translating this piece of paper to the virtual sphere is equally important – doing so successfully could free up fresh opportunities and unleash boundless potential.

But there needs also to be a balance in the way organizations and governments approach the establishment of digital identities. And much of this has to do with data access, ownership, and protection, a key topic that will be explored in the following chapter.



The merging of the physical and the virtual will require us to think harder about what it means to identify ourselves. It is no longer enough to have a piece of paper or a card to show that we are who we claim to be.



Your data, my data, our data

Unlocking the limitless potential of transparent data





As Singapore battled an invisible enemy in the form of the COVID-19 pandemic in 2020, it unleashed an equally invisible weapon: data.

The country launched SenseOps, a visualization and dashboarding app that allowed different government agencies access to multiple data streams in real time, consolidated onto a single platform.¹⁰

This was a game-changer. It streamlined a clunky reaction to the pandemic into an efficient, evidence-based response, accelerated collaboration and communication across the government, and helped to save lives.

At the core of SenseOps was the Asynchronous Data Exchange (ADEX), a common data sharing marketplace that has revolutionized work processes in the public sector.

In the past, data from various agencies existed in silos and had to be collected through a tediously

manual approach. As government agencies found themselves processing increasingly immense volumes of data, a central platform was needed to access and assess data in real time. Enter ADEX. It allows users across agencies to do so – and derive richer insights when needed. This in turn enables more effective, evidence-based policymaking and solutions.

This illustrates how Southeast Asia is becoming increasingly aware of the power that is transparent, real-time data. A staggering 96% of ASEAN executives in our Technology Vision 2023 ASEAN Survey agreed that data transparency is becoming a competitive differentiator for their organizations.

And they are putting in the work to harness its power. As more data silos are broken down, massive, applicable data sets will spring up, impacting organizations and societies. It is clear: enterprises that can turn this into a strategic advantage will go furthest in this era of information.



The business case for transparency

Businesses benefit from transparency. Leaders who have data at their fingertips can make more informed decisions and capitalize on innovation opportunities. Teams can also optimize processes to become more efficient and agile.

Customers who share data also win out. One customer's data may not mean much on its own, but when organizations combine this data, they are better able to identify patterns and trends. Products can be developed to meet customer needs, even before they crystallize for customers themselves.

Vietnamese agriculture technology company MimosasTEK, for example, created a central internet-of-things platform for farmers, harnessing data to improve the precision of irrigation methods.¹¹ This platform consolidated information on soil moisture, precipitation, sunlight and more, helping farmers to accurately adjust irrigation schedules. This reduced farming costs by 30%.¹²

Overall, what this means is a competitive advantage. Organizations that share and use data to power their businesses are efficient, innovative, and forward-looking. They have a clear window into a whole new world of insights that non-data-savvy competitors can only glimpse.

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Data matters to ASEAN

While the case for data is clear, Southeast Asia is not a monolithic bloc. The pace of advancement towards shared, transparent data is uneven across the region.

Data transparency is now an expectation from three key stakeholders: customers, governments, and investors.

Adoption of data transparency strategies also differs across sectors, primarily due to regulatory constraints. The financial sector, for example, has strong data transparency due to regulatory requirements on publishing data. Meanwhile, transparency is weaker in sectors like telecommunications and education, where a strong regulatory framework is lacking.

Still, it is clear that data transparency is now an expectation from three key stakeholders: customers, governments, and investors. Our survey showed that 52% of ASEAN executives reported that customers are a major force behind the shift from data opacity to transparency. A customer walking into a coffee shop, for instance, no longer just wants coffee. They also want to know where the coffee beans came from, how they were sourced, and who produced them.





Governments are also a significant force driving transparency, agreed 44% of executives surveyed. Data allows them to monitor and regulate industries, enforce laws, and make good judgements. With that, new standards of transparency will inevitably fall upon businesses, especially when it comes to how data is shared, stored, and used.

The government of Thailand has already begun to increase transparency within the public sector, launching an open data portal to connect government organizations to data platforms.¹³ The Office of the National Digital Economy and Society Commission, opened in 2023, aims to set a new benchmark for how data is accessed and leveraged by government agencies. The move is set to boost the analytical capabilities of the various government outfits and aid data-driven decision-making in areas such as scenario analysis for project planning, monitoring, and evaluation.

Not far behind governments are investors and shareholders. 41% of ASEAN executives agreed that data transparency plays a big part in assuring them that their investments will generate returns, and that companies are operating lawfully. Companies can give them the information they need to make knowledgeable investment decisions by being transparent with their data.

Southeast Asia is well onboard the data train. But enterprises will need to do three crucial things in order to break through the data revolution: relook data management techniques, focus on building the right infrastructure, and balance security with collection.

What's next that organizations should be thinking about?





A makeover in data management

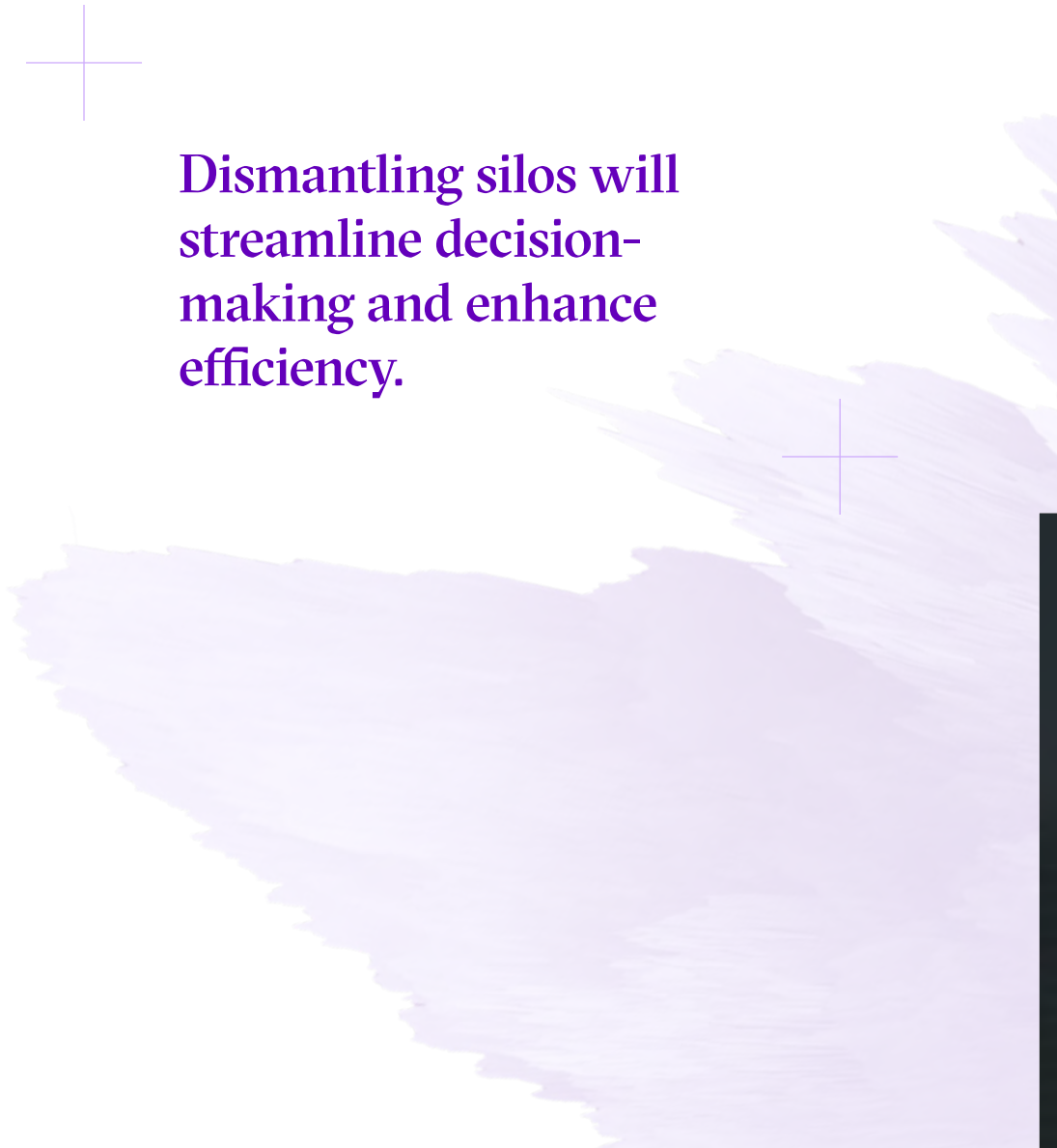
As more businesses begin shoring up their data practices and embracing data transparency, tectonic shifts can be expected in the wider data ecosystem. ASEAN executives have reported spikes in data volume, velocity, and variety, a phenomenon that goes hand in hand with widespread digitalization in the business landscape. 97% agree that emerging data management approaches will be crucial in optimizing their organizations' value chains.

In particular, three key objectives must be met if data is to be optimized.

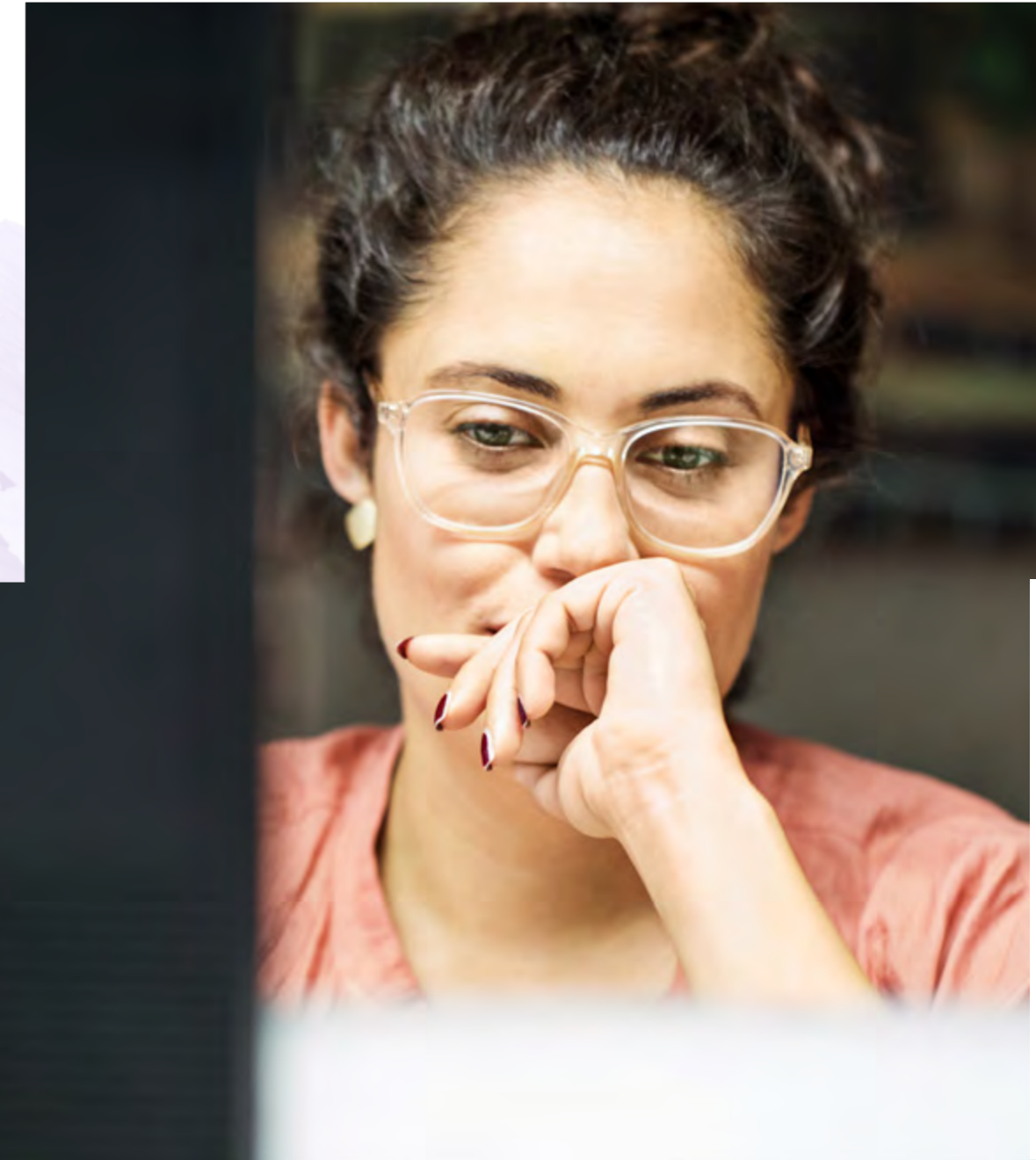
Top of the list is scalability. With the sheer amount of data today, organizations need to initiate a fundamental rethinking of how they manage data. Building a data fabric or data mesh, for instance, can help companies organize and control how increasingly large data sets are accessed, shared, and utilized.

Next is data democratization. Data should be accessible to staff who require it, without the need to jump through tedious barriers to access. Dismantling silos will streamline decision-making and enhance efficiency. Look at how Singpass – a one-stop national digital identity for Singapore residents – has improved and expanded service offerings by sharing data, with over 2,700 e-services available. Core to Singpass' functionality is the API Exchange (APEX) platform. Through the use of Application Programming Interfaces (APIs), data can be shared conveniently and securely, reducing digital silos and duplication of effort.

Finally, data management techniques must create value for companies. This comes in the form of lower business costs as data practices are honed and strengthened, as well as new growth prospects that open up when data is aggregated meaningfully. Essentially, organizations must go one step beyond creating robust data ecosystems. They must also find a way to translate insights into business outcomes.



Dismantling silos will streamline decision-making and enhance efficiency.



Overhauling infrastructure and shifting strategies

Data needs to become part of a company's DNA. Take Siam Commercial Bank (SCB) in Thailand, for example. To be a pioneer among its peers, SCB set out on an ongoing, multi-year transformation journey to jumpstart the business using data as a catalyst of growth and profitability.

By 2035, over 2000 zettabytes are expected to be created worldwide. Data architecture must be adequate to cope with the data deluge. Information infrastructure such as hardware, software, and data policies must be buttressed and expanded. At a systemic level, mindsets, perspectives, and tactics of organizational leaders also need to change to manage and mobilize a growing data load.

Ignoring the need to improve data infrastructure comes with risks such as breaches and cyberattacks. Fortifying data infrastructure will ensure that data is stored safely and securely, with access monitored and regulated. For example, Southeast Asian ride-hailing and food delivery platform Gojek has put in place a number of safeguards to protect data privacy and security, including regular audits of its data infrastructure.¹⁷

But updating infrastructure won't be enough – data needs to become part of a company's DNA. Take Siam Commercial Bank (SCB) in Thailand, for

example.¹⁸ To be a pioneer among its peers, SCB set out on an ongoing, multi-year transformation journey to jumpstart the business using data as a catalyst of growth and profitability. It migrated its foundational data repository to a cloud computing platform, a move that both beefed up security and made data and analytics easier to access and use. The bank also set up a digital factory to spearhead development for its banking app, which increased usership from 2.5 million to 13 million users.¹⁹

What stands out is that SCB did not just digitalize its operations – it digitally transformed them to accelerate growth. Marketers could now tap data dashboards to craft personalized services for prospective customers. Cash levels in ATMs were optimized, reducing delivery costs for ATM replenishment. Customers applying for loans saw reduced waiting times, as automated underwriting risk tools did the legwork behind the scenes.

But SCB did not stop there. It created DataX, a data-driven innovation platform that deploys sophisticated analytics and artificial intelligence to enable seamless and secure data exchange, within and without.²⁰ Information and insights could now flow across business units, while data streams from external sources pollinated the information pool.

Striking a balance

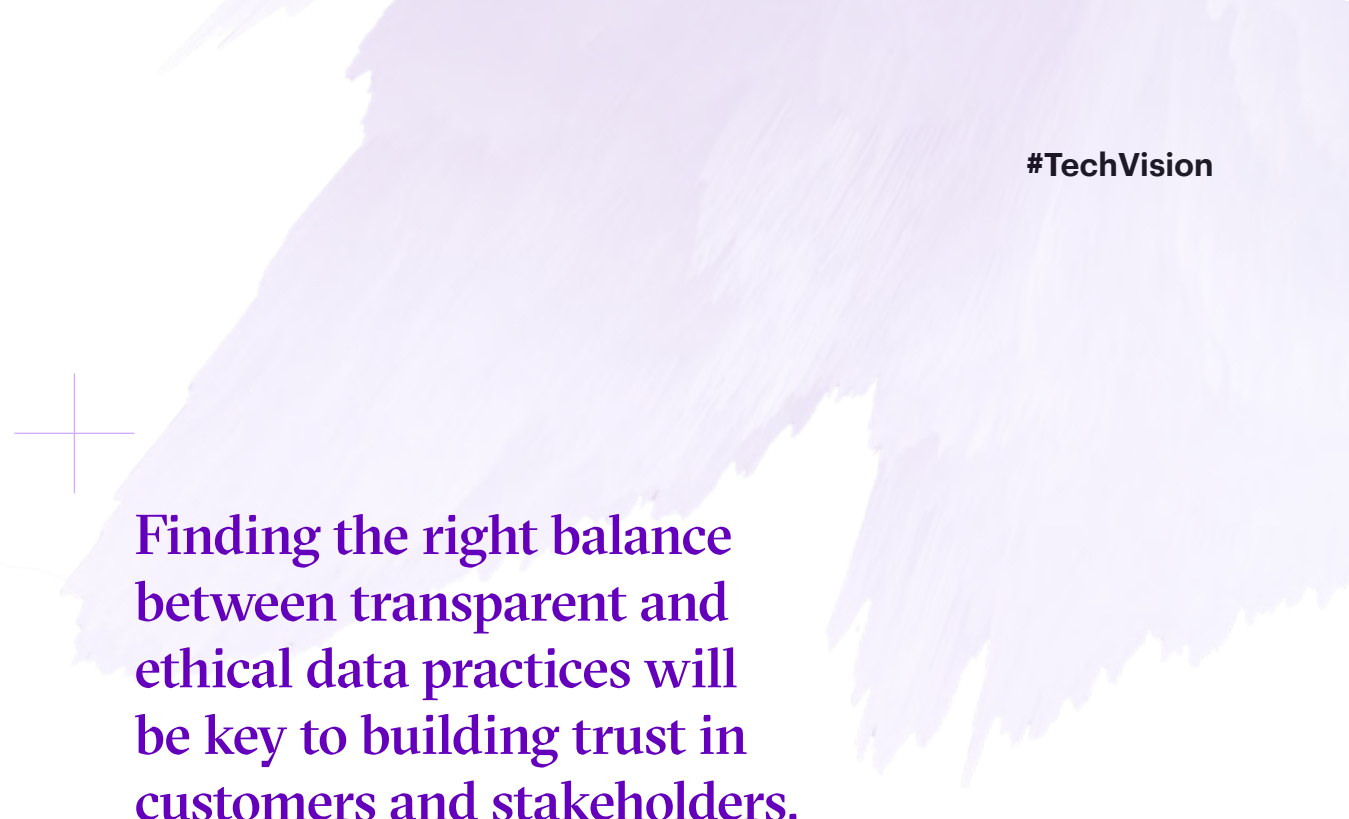
When it comes to transparent data, ethics matters too. As organizations absorb the colossal amounts of data generated from actions as minute as the switching of a tab, the question of how to handle information sensitively and responsibly cannot be an afterthought. It has to be front and center of how organizations think about data.

Transparent and ethical data practices throughout the data lifecycle earn points for a business, boosting confidence amongst customers, business partners, and investors. Organizations must be upfront about what data is collected, how it is used, and who has access to it. Even as data is liberated from its silos, organizations must ensure that guardrails are in place to protect sensitive and confidential

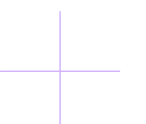

information. Data usage must also comply with the relevant laws, regulations, and ethical standards.

Finding this balance will be key to building trust in customers and stakeholders. And trust is the secret ingredient to efficiency. Since 2011, Singapore's healthcare system – ranked second worldwide in the Bloomberg Health-Efficiency Index in 2020²¹ – has been bolstered by a data sharing platform known as the National Electronic Health Record, a central repository of patient summary health records shared across healthcare providers.²² Vaccination records, for example, can now be accessed even if a patient visits a different healthcare provider. To ensure that patient confidentiality and health information continue to be protected, Singapore's Ministry of Health is tabling the Health Information Bill in the second half of 2023 to further improve data sharing practices and security.

At a regional level, ASEAN is also recognizing the importance of handling data responsibly – which is why it established a Data Management Framework in 2021 to promote sound data governance in the digital economy.²³



Finding the right balance between transparent and ethical data practices will be key to building trust in customers and stakeholders.



The bottom line is that the curtains on data have been lifted. Organizations have new standards to reach, and new tools to get there. Done right, this transformation can create significant value for businesses and individuals even as business landscapes continue to evolve. Cutting-edge technologies such as generative artificial intelligence – which will be explored in the next chapter – are already here. Transparent, ethical data practices are no longer good-to-have, but part of the fabric of business.

Generalizing AI

Shaking up the world with generative AI





Taking the world by storm

Use it wisely.

In May 2023, Singapore issued new guidelines for public officers who were using ChatGPT and other artificial intelligence tools for research and writing. It made clear that public officers are accountable for their work and responsible for fact-checking AI-generated content.²⁴ The guidelines also aim to safeguard data security, by reminding officers not to input sensitive information into these applications.

An Generative AI app, called Pair, a writing and research tool that taps the brains of ChatGPT to assist with civil service work is in rapid development. This is an indication of how quickly generative AI has permeated and upended work processes across industries.

Indeed, Singapore is not the only Southeast Asian nation harnessing the technology's power for the public sector. If it all goes to plan, civil servants in the Philippines will no longer have to stare at a blank document on the computer, as they try to distill huge amounts of information into a public policy. Instead, the hard part will be done by Artificial Intelligence (AI), which will jumpstart the writing process. This is what Philippine-based tech firm

Limitless Lab aims to accomplish when it launched GreatGov GPT – an AI tool for public policy writing – this year.²⁵

These case studies illustrate how the region has recognized the power of generative AI, which has seized global attention and exploded in popularity when ChatGPT launched in November 2022. Such is the speed and scale of the technology's developments that many organizations have been caught by surprise.

But in reality, generative AI has been flying under the radar for years, albeit in much smaller scale and reach. Now, thanks to ChatGPT, generative AI is now opening a new chapter of enterprise intelligence across all sectors.

Such massive potential has ignited an eagerness in organizations across Southeast Asia to apply the technology for their business. Our Technology Vision 2023 ASEAN Survey showed that 98% of ASEAN executives are inspired by the new capabilities offered by AI foundation models – which powers generative AI – with many businesses keen to understand the implications of its disruptive nature.



More progressive organizations have already embarked on piloting generative AI technology, making everything simpler for the user – down to the way we plan for holidays. TripGen, a generative AI chatbot launched by travel agency Trip.com, will soon allow us to make all our travel plans on a single platform.²⁶ TripGen is the AI tour guide, able to compare, book and pay for tickets and accommodations all on one platform. If requested, it even throws in a detailed itinerary too.

It is no longer a question of whether the technology will impact industries in the region, but how. It is a sentiment virtually unanimous across Southeast Asia, with 99% of ASEAN executives agreeing that AI foundation models will play an important role in their organizations' strategies in the next 3 to 5 years. With generative AI, we are now at an inflection point, with the technology set to have a transformative effect on work and reinvent businesses.

It is imperative for every business to understand the capabilities of these AI models, and harness their unique attributes to gain a competitive edge. And while there are huge opportunities for companies to leverage generative AI for enterprise use cases, there are also risk and concerns that must be addressed.

For example, generative AI requires enterprise's data to train and operate. Businesses need to ensure that sensitive data is properly protected from unauthorized access and use. Generative AI's ability to create new content also come with intellectual property risks such as copyright infringement and issues related to fair use.



99%

of ASEAN executives agree that AI foundation models will play an important role in their organizations' strategies in the next 3 to 5 years. With generative AI, we are now at an inflection point, with the technology set to have a transformative effect on work and reinvent businesses.



Maximising potential

Businesses must therefore understand both the opportunities and risks that come with it; peel back the technology stack that comprises generative AI – not just in terms of the possibilities of applications, architecture, and infrastructure but also data privacy, IP and security requirements. They must also understand potential legal, ethical and reputational risks associated with technology and implementation options chosen.

When it comes to generative AI, organizations also need to consider data privacy, IP and security requirements.

After comprehension comes experimentation and implementation. There are many ways to apply generative AI to an organization, and leaders must discern which of these will be best used to maximize value creation and grow one's competitive advantage.

For example, in financial services, generative AI is being used to detect fraud, develop new investment strategies, and personalize customer experiences. In healthcare, generative AI is being used to develop new drugs and treatments, diagnose diseases, and improve patient care. In retail, generative AI is being used to personalize marketing campaigns, recommend products to customers, and improve customer service.



A close-up profile of a man's face, looking towards the right. The background is a warm, golden sunset over a body of water. The lighting is soft and directional, highlighting the contours of his face.

How can businesses ride this technological evolution curve?

Businesses looking to tap into the power of LLMs or generative AI should take the following actions:

Get your proprietary data ready

In the LLM world, proprietary data and domain-specific semantics and methodologies will be the core competitive advantage for a business. To fully take advantage of LLMs, companies need to fine-tune the pre-trained LLMs with company-specific data to better enable the model to operate within the context of their industry and business. The magic will lie in the organization's ability to fine-tune domain and company-specific knowledge.

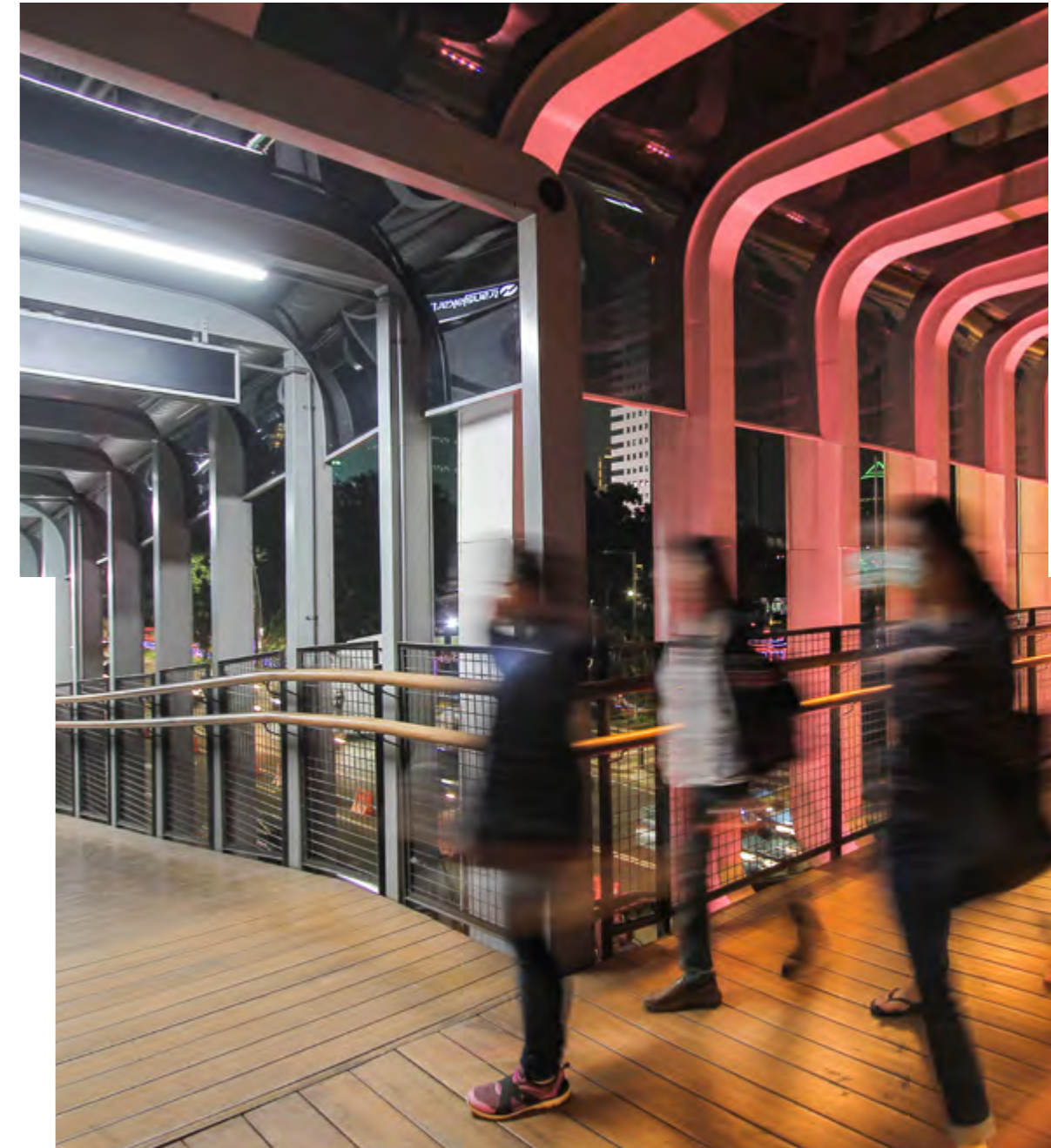
The magic will lie in the organization's ability to fine-tune domain and company-specific knowledge.

Invest in the foundational AI architecture

AI architecture needs to be a de facto architecture to maximize the potential of LLMs across the enterprise, from back-office to customer experience. This means upfront heavy lifting, including labeling data with metadata, creating synthetic data to fill in the gaps, and sharing data as a product and a single source of truth across the company.

Rethink the AI operating model

To date, many large enterprises have chosen to decentralize their data science capabilities; however generative AI requires a hub-and-spoke approach, where foundation models are managed in the centralized hub, while domain-specific fine-tuning is performed "at the edge" with the business experts.





Revamp talent strategies

Every role in every enterprise has the potential to be reinvented and helping everyone keep up with technology-driven change will be the biggest factor in realizing the full potential of generative AI.

Accenture currently estimates that generative AI will impact 40% of people's working hours. Organizations will need to radically rethink how work gets done. Some employees will need to learn new skills to be effective, while others will need to adapt to working with an AI co-pilot all the time. New roles such as Prompt Engineers, Linguistic Engineers, AI QCs, & Editors will also need to be incorporated to harness the power of LLM while upskilling those impacted.

For instance, Accenture has developed a Knowledge Mining Solution for a company that allows its employees to do semantic searches by leveraging large amount of structured and unstructured data. This is also complemented by a chatbot that can answer queries.

There is an opportunity to get this right from the start - companies must reinvent work to find a path to generative AI value. Business leaders must lead the change – in job redesign, task redesign and reskilling people. This starts now.

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At their heart, companies need to be responsible by design that propagates across the AI lifecycle.

Ensure comprehensive AI governance

Using foundation models in an enterprise context is not risk-free – especially if these models are trained on text across the Internet. These models can be exposed to bias, risk of plagiarism, or copyright infringement. There are also open questions about IP ownership and, just as with other forms of AI, the replication of pre-existing biases from the training data. At their heart, companies need to be responsible by design that propagates across the AI lifecycle.

Embrace the AI ecosystem

It is essential to redesign the enterprise ecosystem strategy to ensure the organization is prepared to take advantage of the enormous amount of innovation coming out of AI ecosystem partners, large and small, as a critical accelerant of AI ambition. Days are gone to build everything in-house, especially since the next frontier of AI disruptions is centering around plug-and-play and the ability quickly swap where necessary as a platform competency.

Generative AI is a new era of AI that has the potential to transform work and reinvent business. It is ushering in a new era for Total Enterprise Reinvention, where everything from science to business to society itself will be transformed. The positive impact on human creativity and productivity will be massive. Companies will need to radically rethink how work gets done and invest in people to reap the value of AI in a responsible way.



Our forever frontier

The big bang of computing and science

Charting the future of scientific tech

Drug development is a lengthy and expensive process, one that takes millions of dollars and years of work.

But what if a company could make the entire process much cheaper and a lot faster – from years to months?

Hong Kong-based company Insilico Medicine has done just that, using AI technology to reduce the time and cost required to bring medication to market.²⁷

Using a natural language processing engine, Insilico analyzed data sources such as omics, patents, research publications and clinical trial databases in the process of target discovery. Then, it used its generative chemistry platform, Chemistry42, to identify potential drug candidates, through generative and scoring engines. It took Insilico 30 months to get the potential drug candidate for the lung condition idiopathic pulmonary fibrosis through from Phase 0 to Phase 1 clinical trial.

Such AI technologies are poised to revolutionize the health industry and beyond. Another example is Stethee Pro, an upgrade on the ubiquitous stethoscope and produced in Malaysia.²⁸ Stethee Pro uses AI elements to increase the details and accuracy of how the heart and lungs are examined for diseases.



Over in Thailand, the Siriraj 5G smart hospital has introduced technology like teleconsultation in the ambulance, blockchain-based personal records, and vital sign monitoring to deliver first-in-class medical services to its patients.²⁹ A collaboration between the Faculty of Medicine Siriraj Hospital, National Telecom PLC, and Huawei, it offers a blueprint for hospitals of the future.

These examples indicate how Southeast Asia is developing in the area of technology and science. While much of technology has centered on computing in recent years, this is starting to change. The intersection of science and technology is no longer just the domain of researchers, but of business as well. Creating a quicker feedback loop between technology and science has never been more vital, and this is pushing the envelope across industries in a landscape that will see the big bang of computing and science: Our Forever Frontier.

This is crucial as the world faces unprecedented trials in areas such as healthcare, supply chain, and climate change. With the COVID-19 pandemic sparking real advances in the science tech revolution, many of the developments in the region have been seen in the biopharmaceutical sector especially.

Nonetheless, the disruptive impact of science tech will be felt by all industries, according to a majority of organizations (78%) across Southeast Asia in Our Technology Vision 2023 ASEAN Survey.

These developments in turn will change how businesses operate. The sentiment is virtually unanimous across Southeast Asia, with 99% of ASEAN executives estimating that advancements in science tech will have an impact on their organizations' business processes over the next 3 to 5 years.



99%

of ASEAN executives estimate that advancements in science tech will have an impact on their organizations' business processes over the next 3 to 5 years.

Public-private collaboration

The authorities must provide strong support in cultivating a fertile environment for the development of tech, science and innovation.

An example of this is Singapore's Stronghold Diagnostics Lab (SDL), developed in 2020 by the country's Agency for Science, Technology and Research (A*STAR) and the National University Health System.³⁰ The initiative integrated multi-disciplinary

teams, such as those from A*STAR and the Genome Institute of Singapore, to leverage expertise in high-throughput genomics and data informatics. This meant that the pilot-scale clinical-grade lab could be set up in three months, half the usual time.

SDL played a vital role in Singapore's response to the COVID-19 pandemic. It built on A*STAR's deep capabilities in molecular biology, diagnostic testing, robotics, and smart sensing to be a "lab of the future" that combined biomedical research and engineering while boosting a collective ecosystem effort in research and development.

The public-private partnership in Singapore is a microcosm of the region's efforts to encourage such endeavors. For years, Southeast Asia has been leveraging the ASEAN platform to promote more cooperation in science, technology and innovation – "to translate research outputs into implementable solutions that address the real-life problems faced by citizens".³¹

+

Governments and companies must work hand in hand to create the "forever frontier" where cutting-edge computing and science converge.

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Experimental journeys

The COVID-19 pandemic brought into sharp focus the application of science technologies, specifically, the development of the COVID-19 vaccine.

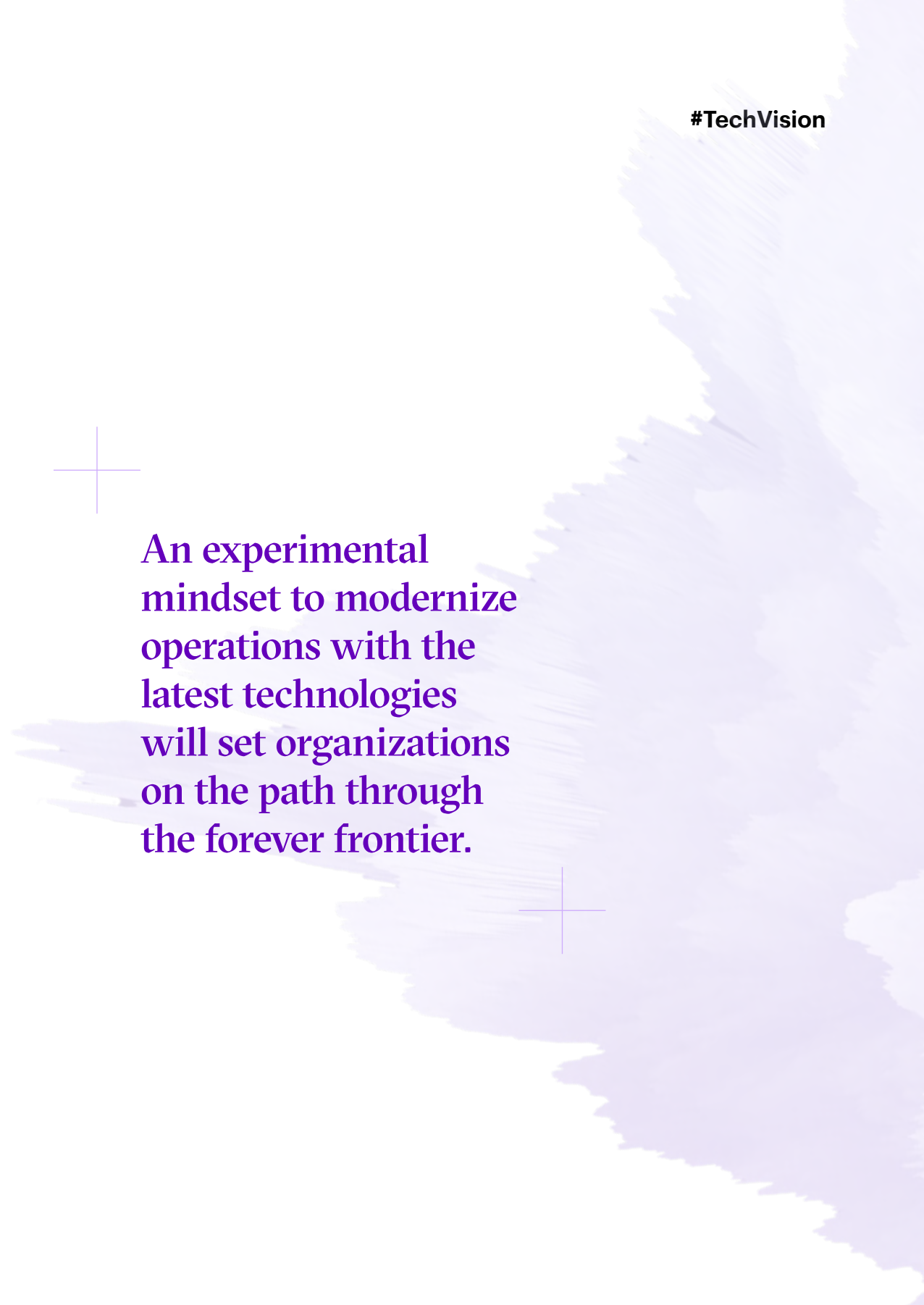
Typically, the timeline for drug development can take 10 to 15 years to launch. The COVID-19 vaccine received emergency use approval approximately a year after the virus was identified in December 2019.

Advances in genomic sequencing and new vaccine tech (mRNA) were key to enabling this. The mRNA vaccine was being developed in the area of oncology when COVID-19 struck, and its use was transferred to address COVID-19 in what is known as drug repurposing. Such experiences will have a groundbreaking effect on drug development in the future, alongside AI technologies like the ones adopted by Insilico.

Sanofi's work on digital twins in Singapore and France is also an illustration of what organizations should be thinking about next: Experimentation journeys to modernize operations with the latest technologies.

The French pharmaceutical company is building a pair of new manufacturing plants, dubbed "Evolutive Facilities", which uses virtual twins to streamline and enhance the manufacturing process of vaccines, for instance.³² Simulated 3D spaces will represent new facilities, equipment and production processes, and real-time data will validate product and plant adjustments before resources are allocated in the physical space.

Sanofi's bold move is an indication of the shift from manufacturers' dependence on manual processes and operations, which are usually hindered by lack of transparency in supply chains. With virtual twinning enabling real-time feedback, the company is better equipped to meet high demand in the event of another pandemic.



An experimental mindset to modernize operations with the latest technologies will set organizations on the path through the forever frontier.



Modern tools for the forever frontier

The opportunities for this new frontier are plentiful, as the realms of computing, science, and business intersect. One key area which will see tremendous opportunity is in healthcare. Among society's major challenges – which include climate change and food insecurity – health-related issues and diseases (85%) were highlighted as the biggest area of potential to harness science tech capabilities, according to ASEAN executives in the Our Technology Vision 2023 ASEAN Survey.

Building on such sentiment, Accenture has set up a digital lab in Singapore – the Accenture Scientific Informatics Services (ASIS) Lab.³³ The lab, part of a global digital lab network with two other labs in Orlando and Dublin, aims to help clients across various industries understand frontier developments and their applications. Whether it is in life sciences, healthcare, manufacturing, energy or chemicals, forward-looking organizations always aim to modernize operations.

The lab will help companies optimize technology and processes and use data to remain competitive in the evolving scientific informatics ecosystem. The lab is also set to boost efforts in processing and analyzing complex laboratory and scientific data to improve operational efficiency and product quality as well as reduce time to market.

Enterprises can better navigate the forever frontier with such fit-for-purpose resources and cloud technology, to take advantage of the science-technology revolution and transform the future.

Besides having an arsenal of modern tools, companies should continue to pursue collaboration to unlock the potential of future technologies, such as next-gen computing. An experimental mindset to dabble with scientifically driven innovations will set enterprises on the path through the forever frontier.



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References

1. <https://www.smartnation.gov.sg/media-hub/press-releases/singpass-factsheet-02032022/>
2. <https://www.marketsandmarkets.com/PressReleases/digital-identity-solutions.asp>
3. <https://www.biometricupdate.com/202301/in-asia-ambitious-digital-id-targets-accompany-digitization>
4. <https://fintechnews.sg/68568/indonesia/how-world-banks-us-250m-investment-will-fuel-indonesias-digital-id-revolution/>
5. <https://www.mimos.my/wp-content/uploads/2020/09/MyDigital-ID.pdf>
6. <https://www.tech.gov.sg/products-and-services/corppass/>
7. <https://asean.org/wp-content/uploads/2021/09/ASEAN-Digital-Masterplan-EDITED.pdf>
8. <https://www.mas.gov.sg/news/media-releases/2022/central-banks-of-indonesia-malaysia-philippines-singapore-and-thailand-seal-cooperation-in-regional-payment-connectivity>
9. <https://www.v-key.com/digital-trust-platform/>
10. <https://www.developer.tech.gov.sg/products/categories/sensor-platforms-and-internet-of-things/asynchronous-data-exchange/case-study>
11. <https://securingwaterforfood.org/innovators/mimosatek>
12. <https://tuoitrenews.vn/news/features/20200921/vietnamese-startup-employs-it-to-empower-farmers/56874.html>
13. <https://opengovasia.com/open-data-platform-to-improve-government-decision-making-in-thailand/>
14. <https://www.singpass.gov.sg/main/>
15. <https://www.developer.tech.gov.sg/products/categories/data-and-apis/apex/overview.html>
16. <https://www.weforum.org/agenda/2022/05/industrial-data-can-unlock-our-sustainable-future-heres-how/>
17. <https://blog.gojek.io/how-we-secure-the-gojek-app-with-241-benchmarks/>
18. <https://www.accenture.com/sg-en/case-studies/artificial-intelligence/siam-commercial-banking-data>
19. <https://www.accenture.com/us-en/insights/consulting/total-enterprise-reinvention-summary>
20. <https://www.scb.co.th/en/personal-banking/stories/business-maker/scb-data-lake.html>
21. <https://www.bloomberg.com/news/articles/2020-12-18/asia-trounces-u-s-in-health-efficiency-index-amid-pandemic>
22. <https://www.moh.gov.sg/news-highlights/details/reviewing-system-enablers-to-support-healthcare-transformations---health-information-bill>
23. https://asean.org/wp-content/uploads/2-ASEAN-Data-Management-Framework_Final.pdf
24. <https://www.straitstimes.com/tech/public-officers-allowed-to-use-chatgpt-and-other-ai-but-must-take-responsibility-for-work-mci>
25. <https://www.limitlesslab.org/post/limitless-lab-launches-greatgov-gpt-an-ai-tool-for-public-policy-writing>
26. <https://skift.com/2023/03/03/why-trip-com-thought-it-needed-a-generative-ai-chatbot/>
27. <https://www.nature.com/articles/d43747-022-00112-7>
28. <https://www.nst.com.my/business/2018/01/330138/malaysia-becomes-worlds-first-ai-enabled-stethoscope-production-base>
29. <https://www.adb.org/sites/default/files/institutional-document/826606/adou2022bp-thailand-digital-entrepreneurship-health.pdf>
30. <https://www.a-star.edu.sg/News/astarNews/news/covid-19/stronghold-diagnostics-lab-boosts-national-capacity-for-covid-19-testing>
31. <https://asean.org/our-communities/economic-community/asean-science-technology-and-innovation/>
32. <https://www.3ds.com/newsroom/press-releases/dassault-systemes-partners-sanofi-optimize-tech-transfer-and-industrialization-its-future-evolutive-facilities>
33. <https://www.accenture.com/sg-en/services/life-sciences/scientific-informatics-services>

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