TEMASEK

Make Trust a Must:

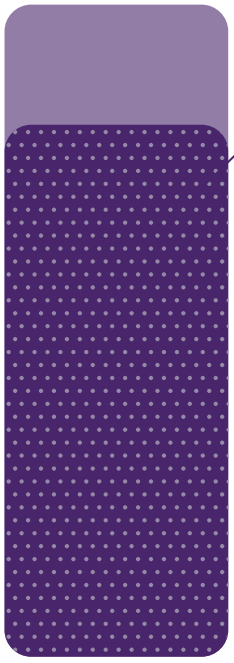
How AI Ethics and Governance is Heralding a New Era for Financial Services

How AI Ethics and Governance is Heralding a New Era for Financial Services

In our check-ins with financial services companies, the responsible use of AI emerged as a key opportunity to drive value.[1] However, it will require trust-enhancing capabilities in AI ethics and governance.

3 in 4

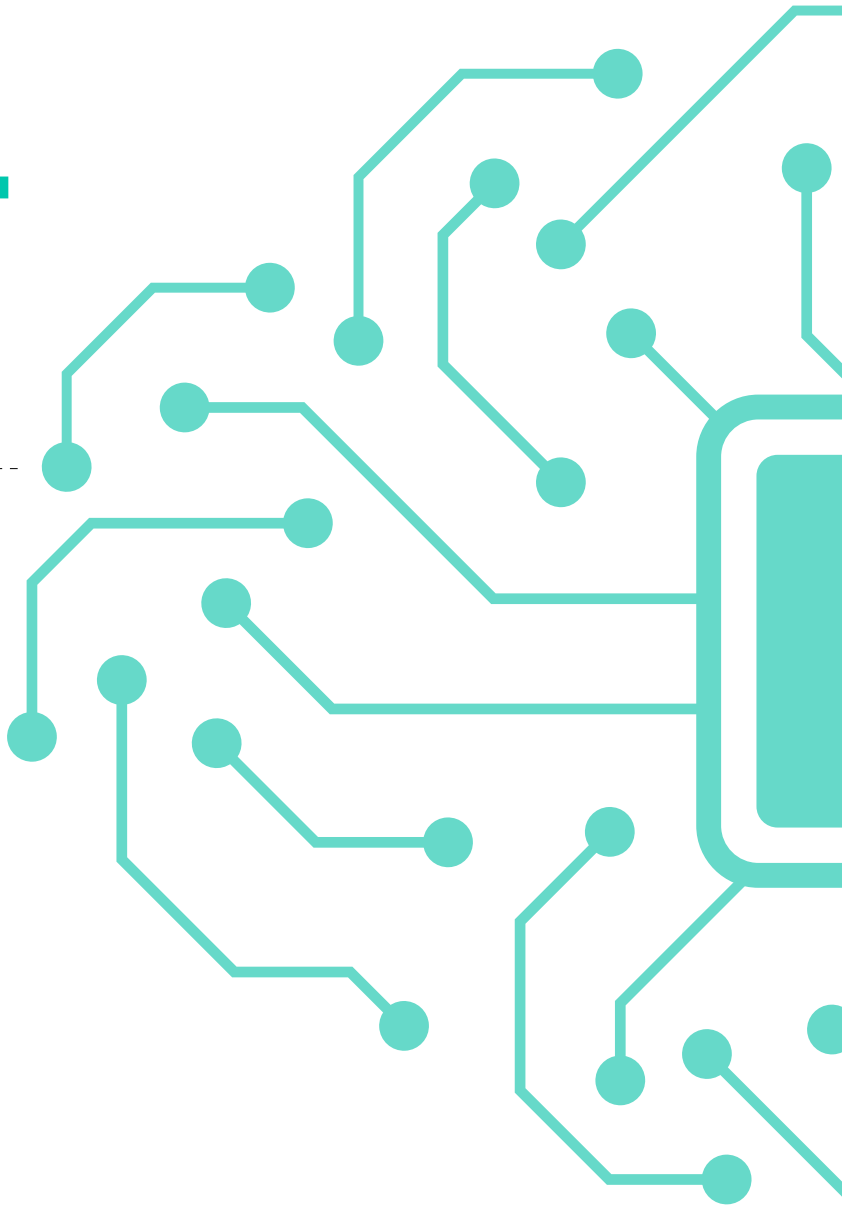
financial services companies want clearer AI ethics and governance standards



Trust needs to be the bedrock of AI in financial services. An overwhelming

93%

of companies demand that AI solutions be trustworthy

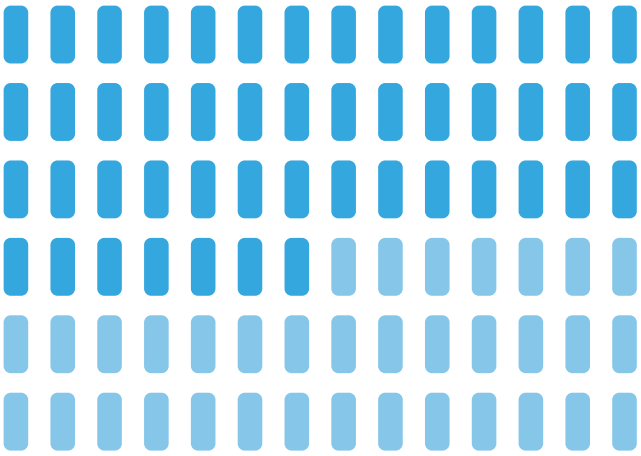


[1] In March 2021, Temasek conducted check-ins with 39 decision makers from banks and insurance companies in the US, Europe, Singapore and Hong Kong. The check-ins were conducted on an anonymous basis and comprised 25 questions, with a strong focus on AI adoption and governance within financial services.

There is an additional

US$2 TRILLION[2]

worth of annual value to be unlocked, if global financial services companies can roll out AI solutions ethically and responsibly



While numerous AI ethics and governance guidelines exist, only

50%

of organisations are familiar with those guidelines, pointing towards clear headroom for advancements.

Today, practically all of the financial services companies use AI in their processes in some way. But differences exist in the extent of AI deployed across companies.

are leaders who are truly using AI in the majority of their processes

To boost the trusted use of AI, financial services companies are relying on mechanisms such as:

1. INTERNAL INDEPENDENT AI RISK AND COMPLIANCE FUNCTION

2. AI GOVERNANCE SOFTWARE SOLUTIONS

3. AI GOVERNANCE TRAINING OR CERTIFICATION PROGRAMMES

4. AI ETHICS COMMITTEES

[2] See Banking and Insurance, "Potential Total Annual Value of AI and Analytics Across Industries," *McKinsey & Company* (analysis).

Introduction

The topic of artificial intelligence (AI) has long fascinated humans, both in fact and fiction. Yet the role it plays in our lives has never been more real. Thanks to rapid advancements over the past decade, AI has matured and is increasingly prevalent. It is driving change in almost every major industry, generating revenue both directly or indirectly. Businesses know that, and they want to cash in. It's estimated that worldwide spend on AI will reach US$110 billion by 2024,[3] with financial services as one of the biggest spenders.

Financial services is a key sector in Temasek's investment portfolio. As at 31 March 2021, it made up 24% of Temasek's S$381 billion net portfolio value. As a generational investor, Temasek is building AI capabilities to not only drive better business outcomes in our ecosystem, but also shape a better world. To do so, AI solutions have to be responsibly designed, developed and deployed.

That's why this report casts a spotlight on financial services, a sector that can expand economic opportunity while meeting societal needs. Financial services has arguably seen some of the most drastic technology-led changes over the years, in part driven by fintech companies. However, with the right strategy, leading banks and insurance companies demonstrate that they can also harness AI to drive better business outcomes. AI solutions could add about US$1 trillion of value each year to global banking and insurance industries respectively.[4]

Since the financial services sector is highly regulated, trust is a must and regulatory requirements are critical for operating decisions.

[3] See "Worldwide Spending on Artificial Intelligence Is Expected to Double in Four Years, Reaching $110 Billion in 2024, According to New IDC Spending Guide," *International Data Corporation* (press release), August 25, 2020.

[4] See Banking and Insurance, "Potential Total Annual Value of AI and Analytics Across Industries," *McKinsey & Company* (analysis).

The world is set to spend

US$110 BILLION

on AI by 2024, with financial services being a major contributor[5]

Our check-ins with 39 banks and insurance companies in the US, Europe, Singapore and Hong Kong found that unclear AI regulation is not a key concern for the adoption of responsible AI.[6] However, almost 80% of companies would benefit from clearer AI ethics and governance standards as well as certification programmes.

In developed markets especially, virtually all of us rely on banks and insurance companies as the providers of integral services in our daily lives. Add to that the sheer number of people employed within the sector, and it's clear that AI will have a far-reaching impact, touching households, businesses and employees. Given these factors, if the financial services sector demonstrates successful adoption and scaling of AI responsibly, it could also contribute best practice standards for other industries.

In producing this report, we spoke to industry leaders to see how AI ethics and governance could accelerate the deployment of transformative AI solutions in financial services, today and tomorrow.

[5] See "Worldwide Spending on Artificial Intelligence Is Expected to Double in Four Years, Reaching $110 Billion in 2024, According to New IDC Spending Guide," *International Data Corporation* (press release), August 25, 2020.

[6] In March 2021, Temasek conducted check-ins with 39 decision makers from banks and insurance companies in the US, Europe, Singapore and Hong Kong. The check-ins were conducted on an anonymous basis and comprised 25 questions, with a strong focus on AI adoption and governance within financial services.

The Current State of AI Ethics and Governance

If you had to rate the prevalence of AI within your organisation, what would your answer be? Chances are you are using AI in some processes, but not the majority. Our check-ins with key players in the financial services sector revealed a clear segmentation.[7] There are leaders and followers at both ends of the spectrum: 13% use AI across the bulk of their processes, while 31% are still dipping their toes in, with few use cases. Over half of the respondents fell somewhere in the middle: using AI in some areas, but not harnessing the full potential.

At the same time, there is broad-based consensus among financial services companies that new and disruptive technologies like AI could introduce new risks. This could be amplified by the essential and sensitive nature of banking and insurance products for consumers and businesses. Consider the potential adverse impact that poorly designed AI could have in the decision process for health insurance, mortgages or SME loan applications.

Financial services firms must take a measured approach when designing and deploying such solutions, explains Michael Zeller, Temasek's head of AI Strategy and Solutions. Strong governance and a focus on ethical considerations are crucial.

Across all industries, key roadblocks that companies face today in scaling AI include a lack of an AI-centric strategy, tech and data infrastructure, gaps in leadership knowledge and a lack of talent. What makes the financial services industry different from many others, however, is the high degree of regulatory requirements across business activities. Contrary to the popular belief that regulatory constraints hinder innovation, our check-ins revealed that 3 in 4 financial services companies appreciate clear regulation and standards on the use of AI.

"Financial services are used to adopting and complying with rules, laws, regulation and international standards. On top of that, the industry has historically also been subjected to very severe fines for breaches," explains Zeller. Specifically, global financial institutions saw fines of over US$10 billion for anti-money laundering (AML) compliance breaches in 2020.[9] Zeller adds, "This has led to risk-conscious corporate cultures with a strong emphasis on risk management."

As custodians of money and risk-related matters for consumers and businesses, trust is a must for banks and insurance companies.

Only

13%

of companies are true AI leaders, using AI across the majority of their processes[8]

[7] In March 2021, Temasek conducted check-ins with 39 decision makers from banks and insurance companies in the US, Europe, Singapore and Hong Kong. The check-ins were conducted on an anonymous basis and comprised 25 questions, with a strong focus on AI adoption and governance within financial services.

[8] Ibid.

[9] Fenergo, "The Financial Regulatory Environment in a Historic Year (January – December 2020)," 35.

“AI risk must be treated as a corporate risk.”

– Achim Granzen, Principal Analyst, Forrester

In fact, an overwhelming 93% of respondents agree that trustworthy AI is mission critical. Governments and regulatory bodies take a corresponding stance.

To encourage industry-led adoption of AI governance, many countries have published non-mandatory guidelines on the responsible use of AI. Australia has its AI Ethics Framework and Canada has published a national AI strategy with guiding principles, to name but two. Singapore has published the Model AI Governance Framework and Principles to Promote Fairness, Ethics, Accountability and Transparency. On top of national guidelines, the European Commission has also put forward its proposal for the first-ever legal framework on AI.

These guidelines and frameworks are centred on common principles: human-centricity, non-maleficence, autonomy, fairness and explicability.

“The impact of AI on society has been a key driver behind the development of these frameworks,” notes Achim Granzen, principal analyst at market research company Forrester. At the core, AI solutions must be built to be human-centric, focusing on the impact on employees, customers and regular citizens.

Granzen observes, “Nearly all AI governance frameworks that have been published over the past two years advocate a risk management approach.” This means AI risk should be managed by not just the IT team or individual business units, but by corporations as a whole. This will add AI risk as a new dimension for corporate risk management in organisations — a move with which Granzen firmly agrees. “AI risk must be treated as a corporate risk.”

He adds that there’s a natural limitation to how detailed government guidelines can be. This is where financial services companies — already used to balancing risk management and requirements — can have an advantage over other industries. In the absence of a standardised framework, companies should use the current AI ethics and governance guidelines as reference for their internal principles and guidelines, adapting and expanding whenever necessary.

Moving forward, Granzen believes “we may see something like “Generally Accepted AI Principles (GAAiP)” emerging.” Much like the Generally Accepted Accounting Principles (GAAP), such principles would form a global, cross-cultural core set, forming the basis of ethical, responsible use of AI.

[10] In March 2021, Temasek conducted check-ins with decision makers from banks and insurance companies in the US, Europe, Singapore and Hong Kong. The check-ins were conducted on an anonymous basis and comprised 25 questions, with a strong focus on AI adoption and governance within financial services.

"AI models must come with an acceptable trade-off between accuracy, explicability and transparency."

– Michael Zeller, Head, AI Strategy and Solutions, Temasek

AI Ethics and Governance Self-regulation is Enabling Growth Today, but There's Room for More

A look at our data shows that both banks and insurance companies are making use of various AI technologies and methods across their entire value chain of key processes. This ranges from loan and insurance underwriting, financial advice for investment products, fraud detection, claims management, marketing, and sales and distribution.

Our check-ins found that almost two-thirds of companies are focusing on more established machine learning (ML) and advanced statistical algorithms. However, only one-third are AI leaders who use advanced AI systems like deep learning and artificial neural networks (ANNs).

One reason is explicability — a key tenet of responsible AI. "Since AI in financial services is by and large used to support and enhance human decision makers, they must be able to understand the recommendations that they are provided," explains Michael Zeller, Head of AI Strategy and Solutions at Temasek.

Take artificial neural networks (ANNs) for example. ANNs comprise multiple hidden layers of nodes, and each of them process input data before passing the "learnings" onto the next layer. It is a complex process that can lead to non-linear patterns where it is not straightforward to see what the nodes have "learned". That is why it can be hard to explain the conclusions of ANNs in an intuitive way.

To meet these AI governance guidelines and risk management requirements, AI models "must come with an acceptable trade-off between accuracy, explicability and transparency," Zeller adds. Today, this is often better achieved through more established ML rather than deep learning models.

That's not to say that deep learning AI systems have no place in financial services. Areas where deep learning techniques have started making a significant difference include the translation of large amounts of unstructured data, such as loan application forms or insurance claim forms, into structured data and insights. Clearly, there is room for more advancements in the use of AI in financial services.

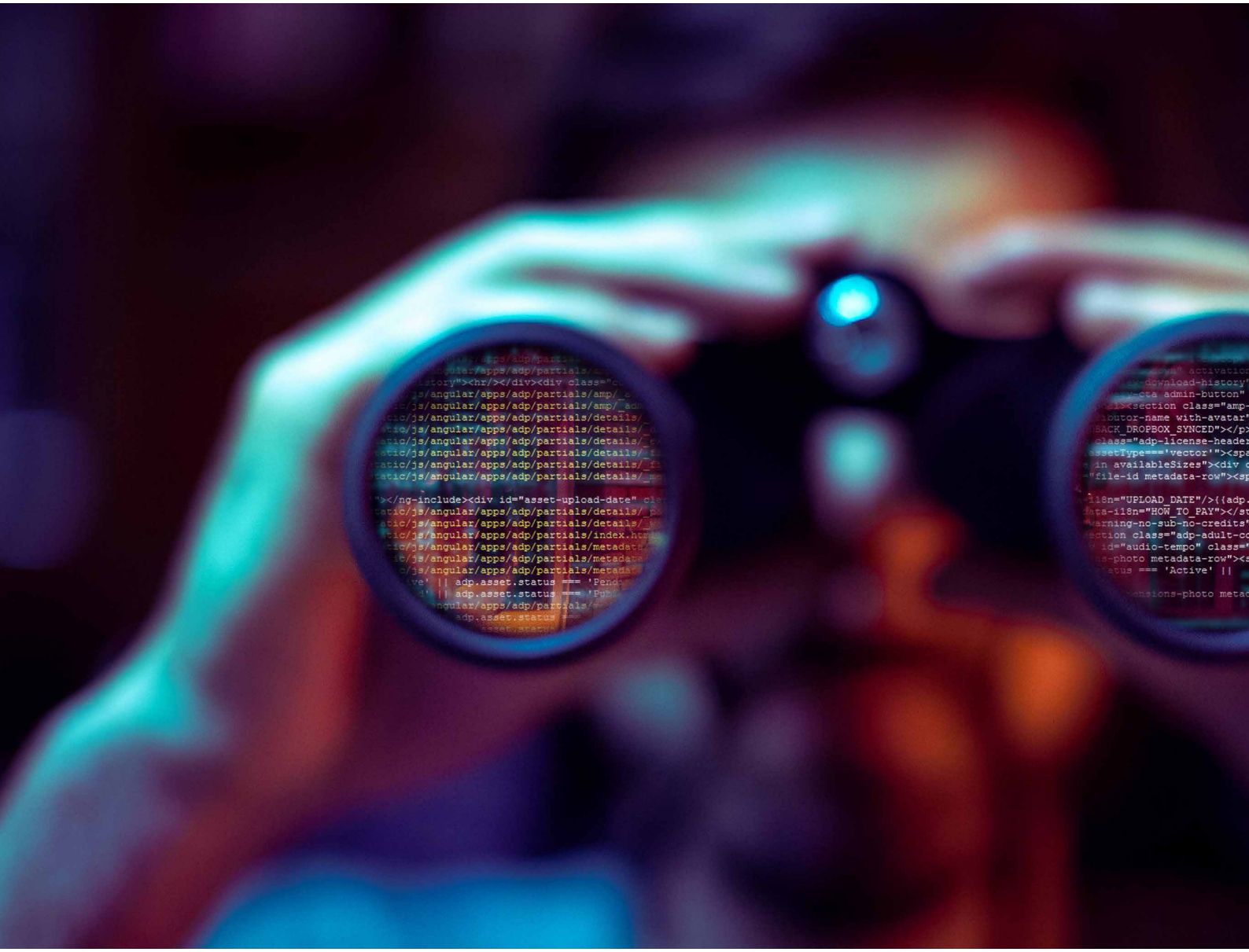
In this complex landscape, financial services companies are

LACK OF AI-LITERACY

among decision makers is the top challenge in insurance companies, and the second-biggest challenge in banking[11]

finding their feet by relying on internal governance mechanisms. These range from creating an AI ethics committee and deploying AI governance software solutions to establishing internal AI risk and compliance functions — all of which require strong AI-literacy across the organisation. On the other hand, our check-ins revealed that a lack of AI-literacy among decision makers is considered the biggest challenge for the adoption and scaling of AI, ahead of inadequate tech and data infrastructure and lack of AI talent. But industry partners have started filling the gap to address this challenge.

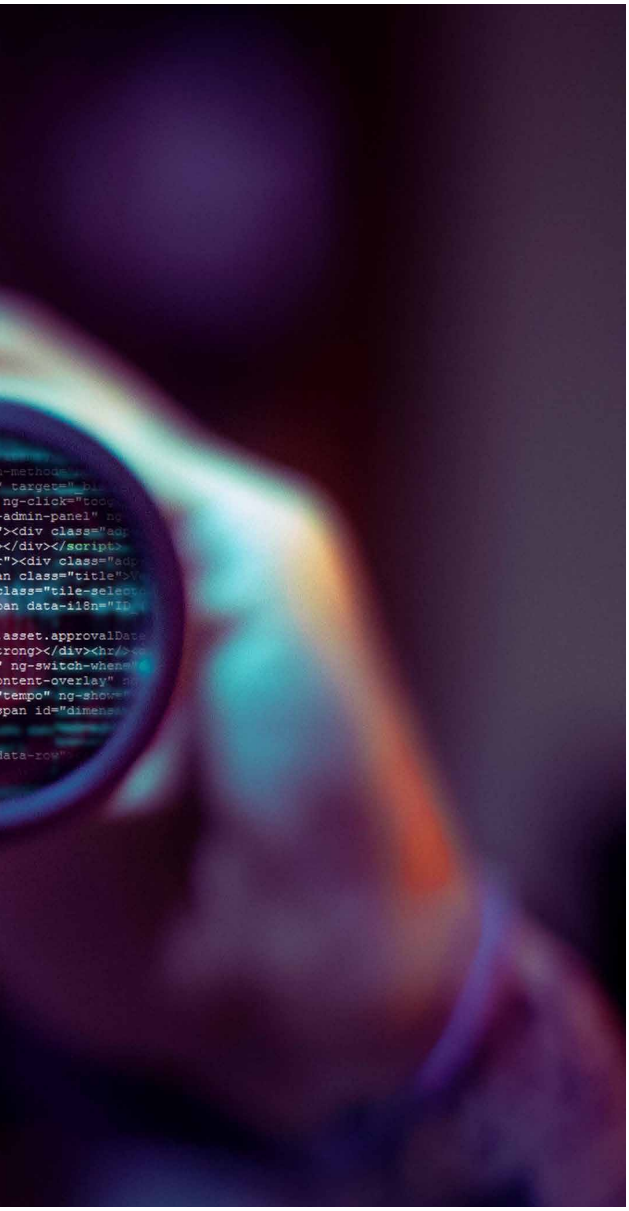
In Singapore, the nation's largest infocomm body, Singapore Computer Society (SCS), seeks to enhance AI ethics and governance capabilities within companies through training and certification programmes. Dr Chong Yoke Sin, president of the SCS, explains that the goal of the programmes is to ensure that professionals have deep expertise in ethics and governance, and are accordingly certified. "Creating a corpus of such trained professionals will



[11] In March 2021, Temasek conducted check-ins with 39 decision makers from banks and insurance companies in the US, Europe, Singapore and Hong Kong. The check-ins were conducted on an anonymous basis and comprised 25 questions, with a strong focus on AI adoption and governance within financial services.

help both AI developers and deployers seriously consider AI's ethical relevance and impact," she explains.

Professional training and certification in AI ethics and governance will also enable financial services companies to better understand existing guidelines — an area only half of the organisations in our check-ins are familiar with. The more informed businesses and professionals are, the more they will be able to leverage best practices to truly unlock the potential value of AI.



A LOOK AT DBS BANK

One leading financial services firm that is already deploying AI at scale with a strong enablement of governance and ethical considerations is DBS. Today, the bank uses AI extensively across front and back-end operations, from improving customer engagement through personalised insights to fighting financial crime and reducing the risk of fraud.

Royce Teo, Managing Director and Group Head of Data Management at DBS' Consumer Banking & Wealth Management Group, explains how AI works for the company. "While there wasn't one standardised AI ethics and governance framework, there has been excellent work done by various institutions that we have researched and referenced to shape how we operate," he says. Teo highlighted that the bank also actively shares its experience with the industry, and contributed to the development of the FEAT (Fairness, Ethics, Accountability and Transparency) principles by the Monetary Authority of Singapore (MAS).

Acknowledging that responsible use of data and AI is mission critical, the bank has developed its own set of responsible data use policies and frameworks. Dubbed the "PURE" (Purposeful, Unsurprising, Respectful and Explainable) framework, it serves as a guide for DBS in building and designing both AI and non-AI solutions.

The key is to get the right trade-off and have risk appetite discussions with leaders about AI, adds Sameer Gupta, Managing Director and Chief Analytics Officer at DBS. Touching on model governance techniques, Gupta says, "There are hundreds of techniques that you can use for fairness, but every technique will give you a slightly different nuance. How do you know which technique to use?" He cautions financial services companies to be clear about the use cases of AI governance frameworks. "If you're not thoughtful about this process, you could restrict yourself."

To that end, DBS has rolled out an AI industrialisation initiative, which aims to build consistent, standardised frameworks and tools for use within the bank. Standardised tool sets and processes not only help the bank develop solutions that can be easily integrated and re-used within systems, but also help improve model explicability.

"This is a rapidly evolving area with new technologies, tools and techniques; ethical considerations may also vary across countries and cultures, and can be fluid over time," Teo shares. This is why DBS does not seek "perfection" but rather, emphasises the importance of "robust, consistent and considered approaches to guide AI".

Navigating the Future by Focusing on AI Ethics and Governance

In today's digital age, consumers are used to technology-powered solutions that provide ease of use and convenience. Few would disagree that financial services companies will benefit from integrating AI solutions into their processes. For several years now, companies in this sector have been making an effort to digitalise their business, as more and more consumers move online.

"A number of the banks and insurance companies we speak with are very focused on digital transformation, taking a cue from big tech and fintech companies who have shown leadership in digital capabilities and delivering superior customer experience," shares Connie Chan, Managing Director, Investment Group (Financial Services), Temasek. So far, they have been focusing on integrating and interpreting rich customer data sources across their various channels and products. Such a move enables traditional financial institutions to "really know their customers, understand and anticipate their needs and shifting habits," says Chan. This knowledge will empower them to deliver frictionless, personalised financial services.

"In the future, we are likely to see more partnerships between tech and financial services companies, as well as more competition."

– Connie Chan, Managing Director, Investment Group (Financial Services), Temasek

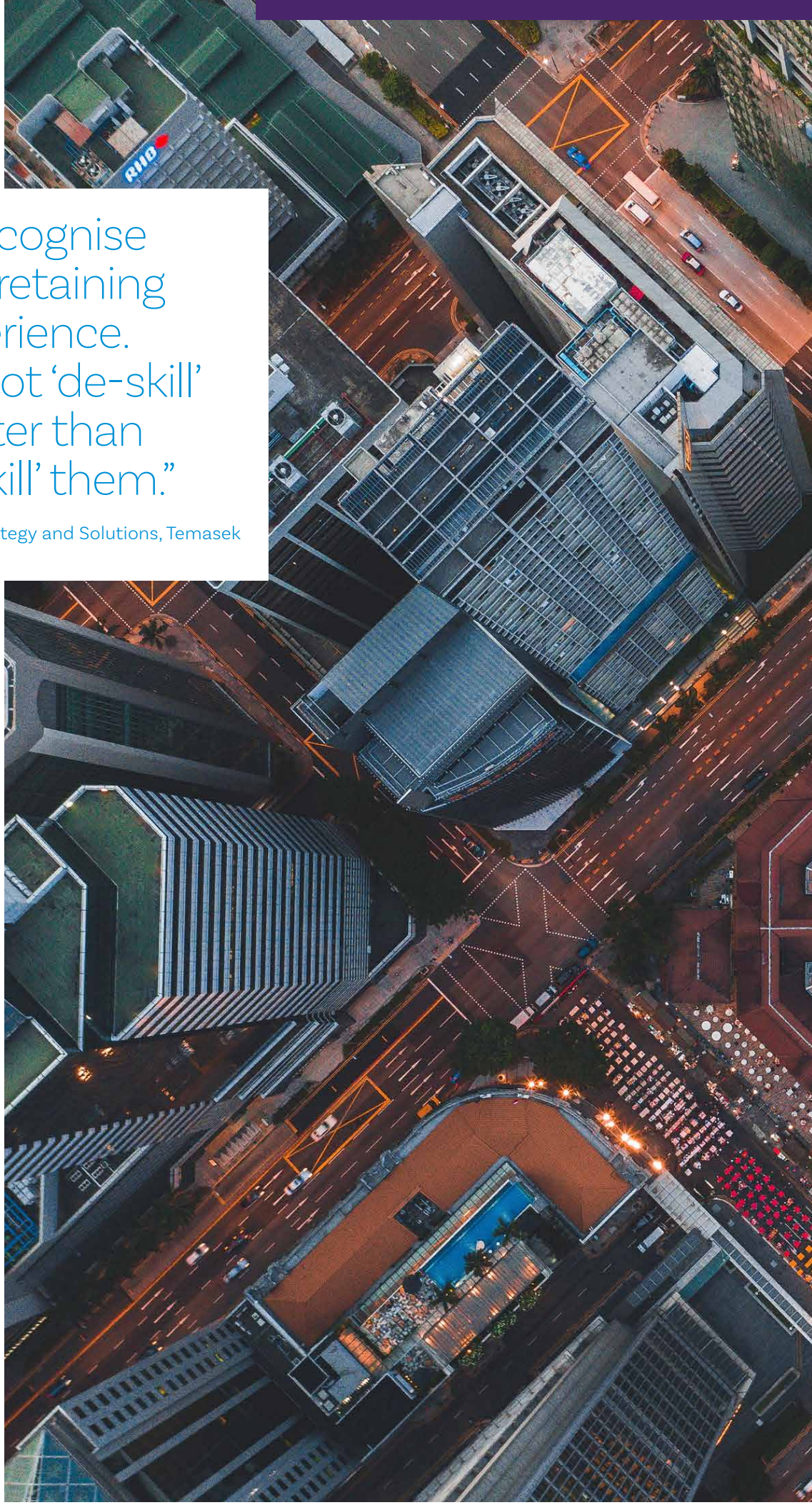
The COVID-19 pandemic has accelerated this digital shift. In just four months in 2020, KPMG noted that the percentage of consumers who preferred contacting brands for support via in-person channels fell.[12] Out of 43% who preferred in-person interactions, over one in three consumers eventually switched to digital channels as their main platform.[12] Experts have suggested that such digital habits are likely to stay post-pandemic.

"Customers will continue to demand greater service and personalisation, and this transformation journey in financial services will play out over time," Chan adds. "In the future, we are likely to see more partnerships between tech and financial services companies, as well as more competition. It is important for traditional incumbents to continue innovating to stay competitive."

Admittedly, differences in the way incumbents and tech companies deploy AI still exist. For one, tech companies often roll out AI with autonomous end-to-end approaches. The banks and insurance companies we surveyed are taking on a more conservative approach where humans usually remain "in the loop" or "over the loop", with AI enhancing human-led decisions. Generally, this is a prudent stance — especially when you consider the typical sensitivity of use cases within banks and insurance companies.

For DBS, the decision to include humans depends on the risk involved in the process, shares the bank's Managing Director and Chief Analytics Officer, Sameer Gupta. AI-enabled hyper-personalisation strategies are typically low risk and as such, can run on their own. Risk and audit-related functions, however, carry higher danger and need humans overseeing the processes. "As we scale up, we want to automate low-risk and

[12] KPMG, "Responding to Consumer Trends in the New Reality," November 2020, 14.



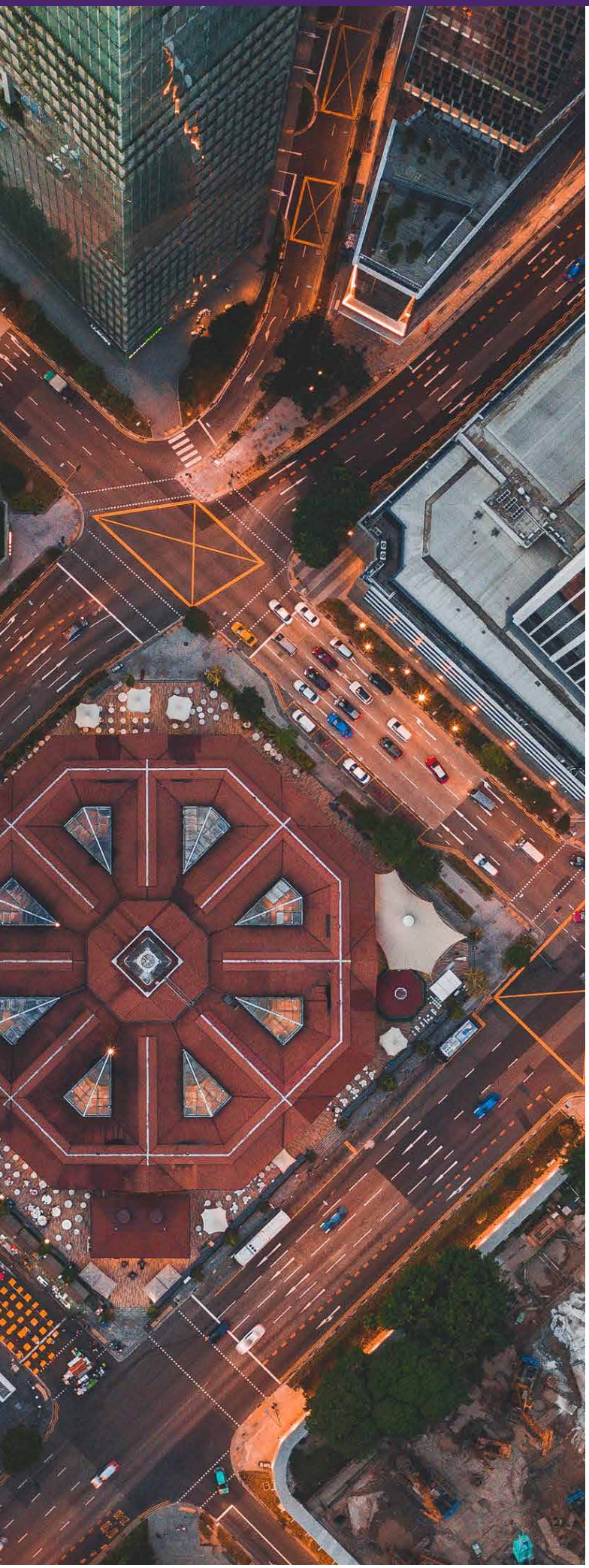
> "We must recognise the value of retaining human experience. We should not 'de-skill' humans faster than we can 're-skill' them."
>
> – Michael Zeller, Head, AI Strategy and Solutions, Temasek

low-materiality processes as much as possible. Because that's where real scale from AI comes from."

ENHANCING TRUST WITH HUMANS AS THE FOCUS

Only using end-to-end automation in processes selectively and judiciously may not be a disadvantage for financial services companies. Building human-centric AI solutions with a strong focus on governance and ethics will help to increase trust with consumers. This helps financial services companies create competitive advantages vis-à-vis market entrants that choose to neglect this.

It will also address resistance against AI within the workforce, one of the emerging challenges faced by insurance companies. "Staff should be assured that AI is not there to blindly replace them but rather, to reduce routine tasks, enhance productivity and drive innovation," says Temasek's Zeller. "We must recognise the value of



retaining human experience. We should not 'de-skill' humans faster than we can 're-skill' them."

"Ultimately, the question is not what AI can do, but what AI should do," emphasises Dr Chong Yoke Sin, president of the Singapore Computer Society. Responsible AI must take into account the individual who is using or is affected by AI. "It is not just about the technology and methodologies but also the human at the centre of our analysis and decision-making," she maintains. A focus on human impact, complemented by secondary principles and values such as auditability and robustness, will be needed to achieve a core set of global norms for ethical AI.

ADOPTING AN INDUSTRY-WIDE APPROACH

It is this desire to form general norms for ethical AI use that led to the development of the Infocomm Media Development Authority's (IMDA) AI Model Governance Framework. "As AI technologies evolve and develop, it is key to balance innovation through AI and public confidence in AI," says Yeong Zee Kin, Assistant Chief Executive (Data Innovation and Protection), IMDA, who spearheaded the development of the Framework. In the process, IMDA gathered input from companies of all sizes, as well as partners like the World Economic Forum.

The framework also takes cue from international developments in AI ethics and governance, shares Yeong. This is because "Singapore strongly supports an open and interoperable international environment that enables human-centric AI innovation and adoption".

The result is a "broad, standardised approach that cuts across all sectors in order to ensure consistent practices in Singapore." As each sector has its specific needs, IMDA also works closely with other regulators such as the Monetary Authority of Singapore (MAS) on sector-specific guidelines.

Li Xuchun, Head of AI Development Office (FinTech & Innovation Group) at the Monetary Authority of Singapore (MAS), who played a key role in the launch of MAS' Fairness, Ethics, Accountability and Transparency (FEAT) principles and Veritas, shares more. "After we published the principles, we received feedback from financial institutions: they wanted to know how to implement FEAT in their processes. To address this,

we created Veritas," he says.

Veritas — part of Singapore's National AI Strategy — provides a verifiable way for financial institutions to incorporate the FEAT principles into their solutions. Industry partners, including financial services companies and tech companies, contributed to the White Papers on the methodologies and selection of use cases. "The goal of Veritas is to develop one concrete methodology to evaluate FEAT," explains Li. The initiative completed its first phase with a focus on fairness assessment methodology in credit scoring and customer marketing in January 2021.

Fairness is another key consideration for use-cases across banks and insurance companies. Take, for example, the underwriting of health insurance, which uses sensitive attributes such as health risks. A responsible approach would have to ensure that outcomes for applicants will not be disproportionately influenced by personal characteristics that should not play a role.

According to Li, financial institutions will also need to overcome existing challenges such as lack of AI-literacy and lack of AI talent in order to effectively integrate Veritas once it is completed. "They need to be able to understand the methodology and mitigate the risk of AI, as well as have employees that can implement it into their processes."

Meanwhile, other industry players are stepping up to help accelerate industry adoption of responsible AI. The SCS has published an AI Ethics and Governance Body of Knowledge (BoK) in collaboration with the Infocomm Media Development Authority (IMDA).

This living document complements IMDA's Model AI Governance Framework by addressing practical issues related to human safety, fairness, and prevailing privacy, data governance, and general ethical values, says Dr Chong. "What the government is doing is essential, but it's also crucial to have the industry participate."

Enterprise technology companies — no strangers to implementing AI — are also contributing to the ecosystem. For example, Microsoft is part of the Veritas consortium. Johannes Gehrke, Managing Director of Microsoft Research, believes that the industry norms for use cases set by Veritas will "move the industry forward."

The goal for Microsoft is to make responsible AI accessible for every individual and organisation. Gehrke shares that they do this by using "a thoughtful, human-centred approach when designing AI innovations to extend and empower people's

capabilities in all aspects of life."

The company also regularly works with organisations, including financial services companies, to develop and deploy responsible AI solutions. As part of US-based Consumer Financial Protection Bureau's Tech Sprint hackathon last year, Microsoft worked with HSBC to develop a way for consumers to better understand why their loans were declined by AI models. As Gehrke explains, "Responsible AI is not a purely technical problem; you can't solve it with just a software tool or engineering method." That's why Microsoft works with companies to pair tools with "organisational capability to justify the AI deployment relative to societal and ethical questions."

It is such collaboration within a connected ecosystem that will enable financial services companies to accelerate and scale their deployment of responsible AI. As Temasek's Zeller notes, risk management and compliance practices are already second nature to financial services companies.

Financial services companies must play this to their advantage, leveraging their strong foundation and incorporating AI governance principles into their frameworks. This way, they can accelerate the deployment of transformative AI services and demonstrate the business benefits of responsible AI across industries.

The Road Ahead

While most financial services companies have started on their AI journey, there is a clear distinction between AI leaders and followers. This distance in between shows that there's more room for growth.

What's also clear is the benefit of adoption and scaling of responsible AI. It empowers companies in this sector by driving better business outcomes and delivering more personalised experiences to customers while preserving the long-held role as trusted custodians. If deployed ethically, human-centric AI could also have a positive impact on the workforce. AI systems could take over the routine, onerous tasks from employees and free up their time to focus on higher-value work. Moreover, AI leaders have demonstrated that they proactively foster AI-literacy across the organisation through training and professional certification.

Certainly, the road to scaling AI is not without challenges and risks. But banks and insurance companies cannot afford to use this as an excuse to shy away. Faced with stiff competition — such as that from new market entrants like fintech and

consumer tech companies — traditional incumbents must innovate to protect their position and enhance market share. Moving towards an AI and data-centric business model, combined with ethical considerations and governance, will be critical in maintaining a trusted and differentiated value proposition for customers.

As our check-ins revealed, most banks and insurance companies agree that an international consensus on AI ethics and governance in the form of a standardised framework would help. This especially rings true for those with a global footprint, whose work extends across borders. Clearer international standards and the convergence of regulations would also enable them to efficiently share data, as they deploy cross-border AI solutions.

Finally, Singapore's financial services sector has shown that collaboration across the ecosystem can help the industry evolve.

By working together, the financial services industry will be able to unlock the full potential of responsible AI, reinventing the way they meet the needs of society and power economic growth.

In addition to the check-ins, Temasek also conducted interviews with industry experts to gather their thoughts on the role of AI ethics and governance in financial services.

SPECIAL THANKS TO:

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