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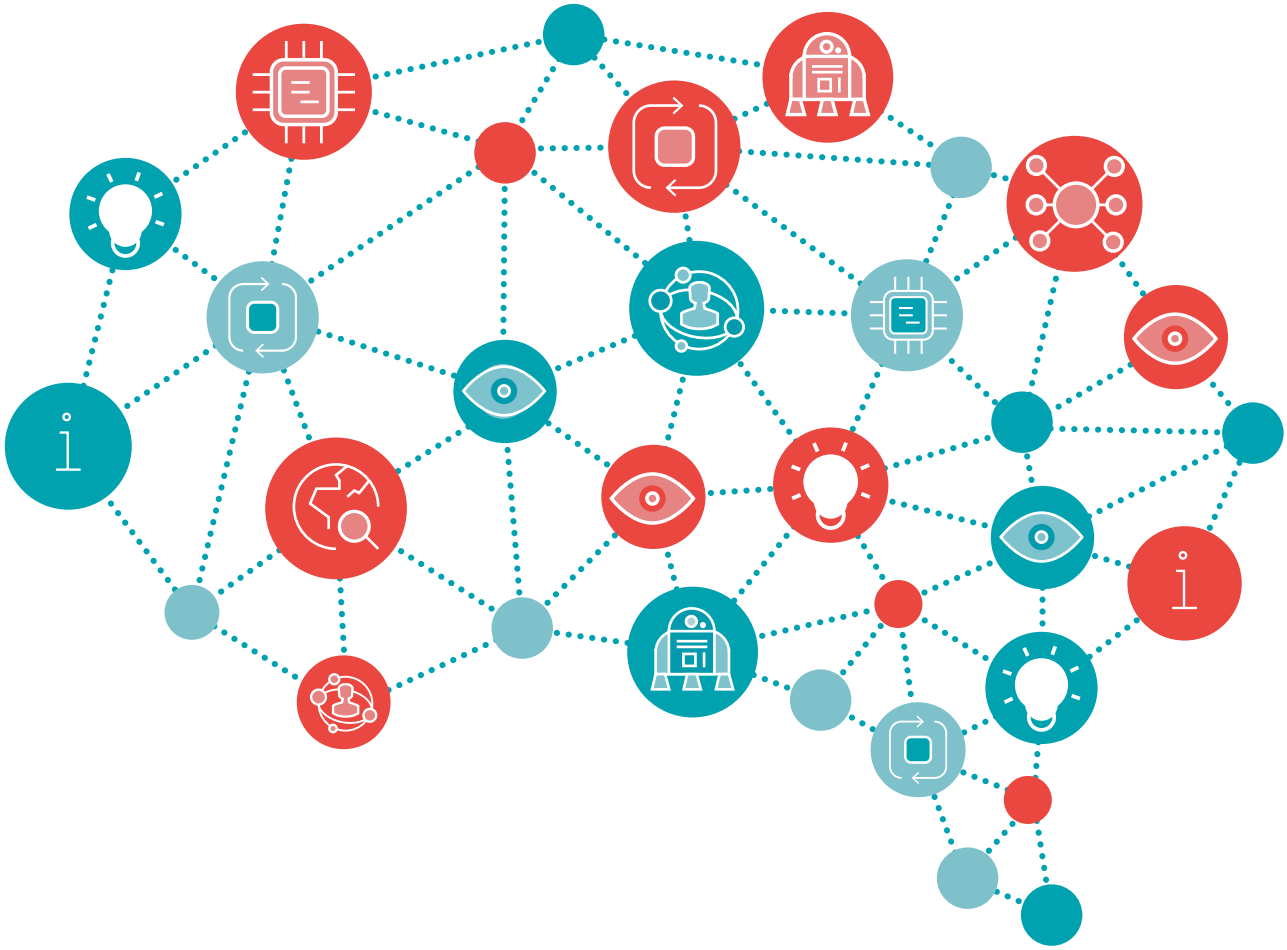
Towards an AI-powered UK:

UK-based financial and related professional services



October 2019

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About the IRSG

The International Regulatory Strategy Group (IRSG) is a practitioner-led group comprising senior leaders from across the UK-based financial and related professional services industry. It is one of the leading cross-sectoral groups in Europe for the industry to discuss and act upon regulatory developments.

With an overall goal of promoting sustainable economic growth, the IRSG seeks to identify opportunities for engagement with governments, regulators and European and international institutions to advocate for an international framework that will facilitate open and competitive capital markets globally. Its role includes identifying strategic level issues where a cross-sectoral position can add value to existing views.

About Accenture

Accenture is a leading global professional services company, providing a broad range of services and solutions in strategy, consulting, digital, technology and operations. Combining unmatched experience and specialized skills across more than 40 industries and all business functions – underpinned by the world's largest delivery network – Accenture works at the intersection of business and technology to help clients improve their performance and create sustainable value for their stakeholders. With 482,000 people serving clients in more than 120 countries, Accenture drives innovation to improve the way the world works and lives.
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CONTENTS

FOREWORD

The UK is on the cusp of the fourth industrial revolution. New technologies and innovations are enhancing and optimising how organisations use data and digital channels to deliver products and services.

The UK-based financial and related professional services industry is at the forefront of this revolution. It is already undergoing a digital transformation and is now adopting emerging Artificial Intelligence (AI) technologies.

This includes decision making with data-driven analytics, creating tailored products for clients and consumers, using AI to support consumers with accessing services and enhancing the skills and output of the workforce. However, this is only the beginning. AI is reinventing how financial and related professional services companies operate and compete. It is a transformative technology. AI creates tangible business outcomes through the ability to learn, adapt and improve autonomously – at increasingly lower costs.

And far from reducing employment levels, AI will enable job creation and increase productivity. As this report highlights, the use of AI across the economy could boost the UK's labour productivity by 25% by 2035 and add £650bn to UK gross value added (GVA).

The UK has the potential to be a world leader in AI. It has a vibrant ecosystem of top talent, world-leading AI research centres, a strong technology industry and digital infrastructure and a growing number of AI start-ups. In addition, this progress is being underpinned by the ongoing development of best practice by industry and regulators enabling innovation through a range of domestic and international initiatives.

Our research found that the fundamentals of the UK's regulatory architecture remain robust and fit for purpose for current applications of AI. But as the technology becomes more transformative and breaks new ground on, say, the use of data, the sophistication of decision making and the autonomy of its own development, further thinking on policy might be needed.

We believe that the best response to this would be a combination of industry best practice and leveraging existing regulatory frameworks. This will be the most effective way to ensure that there are proper consumer safeguards and that market stability is maintained, while at the same time facilitating innovation and growth.

This balanced approach will drive the industry's transformation and strengthen the UK's position as a world-leading centre for financial and related professional services.

This report has been made possible by the insights we received from across the industry and stakeholders, including the Financial Conduct Authority and the Office for Artificial Intelligence. I would like to thank Fernando Lucini and the team at Accenture for their work with the IRSG in producing this timely contribution to a debate that will help shape the industry's future.

Mark Hoban
Chair, IRSG Council

EXECUTIVE SUMMARY

The advent of the fourth industrial revolution has led to rapid advancements in emerging technologies, which are changing how people work and live. In just a few years, Artificial Intelligence (AI) has gained unparalleled traction across many industries. Organisations on the journey of digital transformation are increasingly turning to AI to enable data-driven decision making, optimise products and services, to increase efficiency, reduce costs, to empower their workforce, and create value across societies.

The aims of this report are to:

- explore the opportunity afforded by AI in the context of the UK-based financial and related professional services industry – including the benefits and risks of AI
- contribute to the ongoing discussion about how the UK government and regulatory bodies can encourage AI-powered innovation while mitigating any potential risks arising from industry-wide adoption.

The overall AI opportunity

AI technologies can be harnessed to help organisations balance numerous regulatory and business priorities, including fluid consumer expectations and demands; stay relevant in a highly competitive environment, and manage and mitigate consumer, technological and systemic risks. Against this backdrop of competing priorities, companies increasing their investment in AI-powered innovation can expect significant returns in the race to gain competitive edge – making AI a potential driver of exponential growth and opportunity.

The context for the UK-based financial and related professional services industry

The UK-based financial and related professional services industry is ready to reap the benefits of AI. At both the international level and within the UK, we are witnessing in parallel policymakers and regulators raising questions about the unique regulatory opportunities and challenges posed by digital technologies and new business models. As the digital economy grows, regulators and policymakers must continue to embrace innovative approaches to keep pace with the speed of technological development.

Approach to this report

This report is focused on the UK-based financial and related professional services industry. It is based on in-depth, face-to-face interviews with leading professionals from banking, insurance, asset management, legal services and market infrastructure firms. In light of TheCityUK's convening of the Financial Services Skills Taskforce, commissioned by the former Chancellor in 2018, it was agreed that skills policy would not be a focus of this report.

The report underlines and unpicks the understanding of how AI will bring a range of benefits for industry participants and consumers alike, including:

- **Higher revenue growth:** creating new business models, products and services and allowing companies to reach new customer segments.
- **Increased cost savings:** AI enables greater efficiency across business operations.
- **Improved customer experience:** institutions will be able to rapidly deliver highly customised service offerings for new and existing target segments using omni-channel experiences.
- **Better risk mitigation:** boosting the quality and speed of risk management, fraud prevention and other compliance activities and practices.

Summary of key findings

UK-based financial and related professional services firms are increasingly adopting AI technologies for industry-specific use cases. The IRSG and Accenture research found that firms' strategic approach to adoption and implementation varied according to the industry segment and the type of customers serviced by the firm. While many business and technology leaders recognise that AI projects are at an early stage, a number of firms are holistically considering the applications of AI across their business. Figure 1 identifies four key themes and recommended best practices that firms will need to consider to develop and deploy fair and transparent AI systems that respect security and privacy-by-design principles and that are underpinned by a strong governance framework to maintain the integrity of the financial system.

FIGURE 1:
UK-based financial and related professional services industry AI recommended best practices

AI fairness, transparency, and consumer protection	Design, deploy and monitor auditable AI systems which are underpinned by robust checks and controls, including periodic sampling of end outcomes. This would help firms to set parameters for using the outputs of AI systems with confidence and would help reduce the risk of unintended consequences.
	Develop an ethical AI framework aligned with core corporate values and with wider industry standards and best practices. This would help firms by providing clarity on what information is required for consumers and clients.
Data privacy and security	Create a set of data ethics principles for the collection, processing, aggregation and sharing of customer information to build digital trust. This would help enhance public trust in AI and improve the public perception of the capabilities, benefits and risks of emerging technologies, and their wider impact on society.
	Update risk frameworks to incorporate contingency plans for incorrect outcomes associated with a range of inputs, including the use of inaccurate historic data. Firms should understand the scope for the use of aggregated historical data that could be used to generate new data sets.
	Partner with regulatory bodies to further explore opportunities to set up new data sharing infrastructure including Data Trusts. Some firms were in favour of an extension of data sharing rights with third parties.
Governance	Improve digital capabilities/tech literacy opportunities across the organisation and at the Executive Board level to ensure accountability. The potential for AI to be embedded across the entire business requires a shift in corporate oversight from the traditional approach of delegating tech matters to a Chief Technology Officer or equivalent figure.
	Review roles and responsibilities for AI within the existing accountability framework and designate formal responsibility for AI governance. Firms require certainty that the application of AI does not challenge traditional accountability lines.
Ecosystem resilience	Ensure there is strong traceability of data and algorithms for both in-house, customised and standardised AI systems. This is to ensure that applications of AI and machine learning do not result in new and unexpected forms of interconnectedness between financial markets and institutions.
	Develop business continuity and resilience plans in the event of a failure/threat. This will require the retention of greater human oversight of AI systems. Human oversight and control of AI systems would reduce the occurrence of new risks and avoid exacerbating risks which already exist within the financial system, and that could result in systemic threats.

A suggested approach to AI policy development for UK government and regulators

Our engagement across the industry indicated that the UK's regulatory architecture remains robust and fit for purpose for addressing AI and that there are no regulatory barriers to the use of AI. However, UK policymakers will play a key role in encouraging the growth and adoption of AI in the UK-based financial and related professional services industry by fostering an innovation-friendly environment. This includes treading a careful balance between supporting businesses to innovate responsibly using AI as they trial and deploy these emerging technologies across their business. The leveraging and application of existing tried-and-tested regulatory frameworks supplemented by updated codes of practice and industry standards will enable AI to thrive (see page 33).

To foster an innovation-friendly environment for AI, it is proposed that regulators adopt a suggested approach to policy development based on the following principles:

1. **Where possible, leverage and adapt existing regulatory solutions and frameworks.** For example, the Senior Managers and Certification Regime (SMCR) remains a viable tool for making individuals accountable and can be applied to assign accountability for AI-driven outcomes.

2. **Where novel categories of risk emerge, ensure that targeted regulatory remedies are available to protect consumers, encourage healthy competition, and ensure market stability.** For example, customer redress channels and frameworks for customers seeking recourse for AI-derived outcomes would need to be adapted and promoted.

3. **Foster an innovation-friendly business ecosystem enabled by a principles-based, outcome-focused approach to regulation and avoid the imposition of prescriptive rules to allow for flexibility in application and for adaptability over time.** To illustrate, close collaboration with the industry would be useful for defining a set of principles for transparency and explainability of the application of AI across various use cases in the financial and related professional services industry.

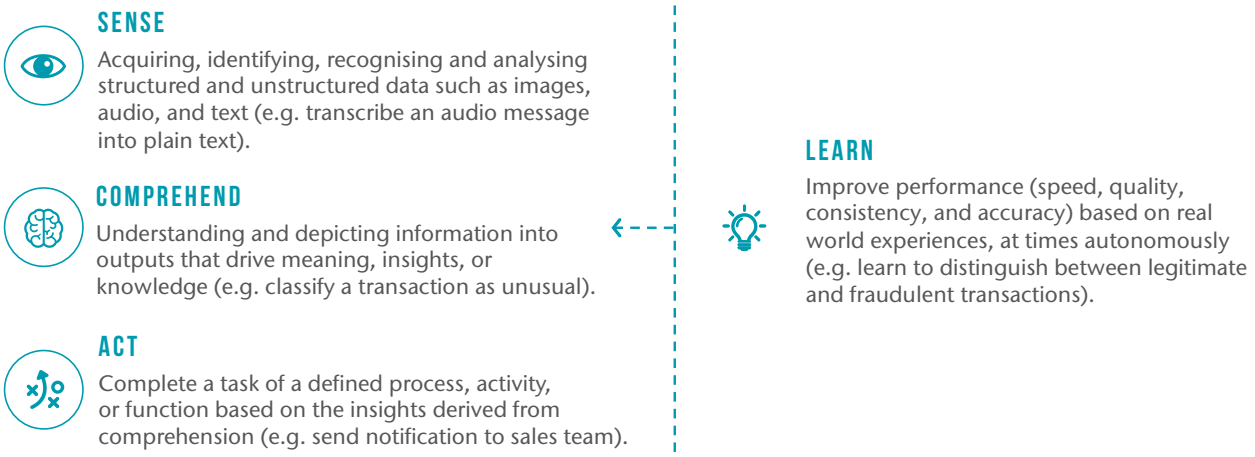
4. **Adopt a risk-adjusted approach to supervising AI deployment by taking into consideration aspects such as context specificity for AI use cases as well as impact assessments.** For example, regulatory guidance issued for firms would need to be tailored to account for sector, and AI use case.

INTRODUCTION: ARTIFICIAL INTELLIGENCE

AI, along with other technologies such as Distributed Ledger Technology, Extended Reality and Quantum Computing, is part of the next set of innovations that will spark disruption and act as a source of competitive advantage for businesses and governments alike. If harnessed effectively, these technologies offer unique opportunities to create and scale business value in a significant way and challenge traditional notions of business boundaries and value-creation strategies.

AI is a constellation of technologies and systems with advanced processing capabilities that can perform complex tasks such as learning, speech recognition, planning and problem solving. AI technologies can augment human intelligence and improve performance by sensing, comprehending and acting. Crucially, these systems can continuously learn and improve based on feedback. Autonomous self-learning and a low cost to scale accelerates the diffusion of AI across businesses and society.

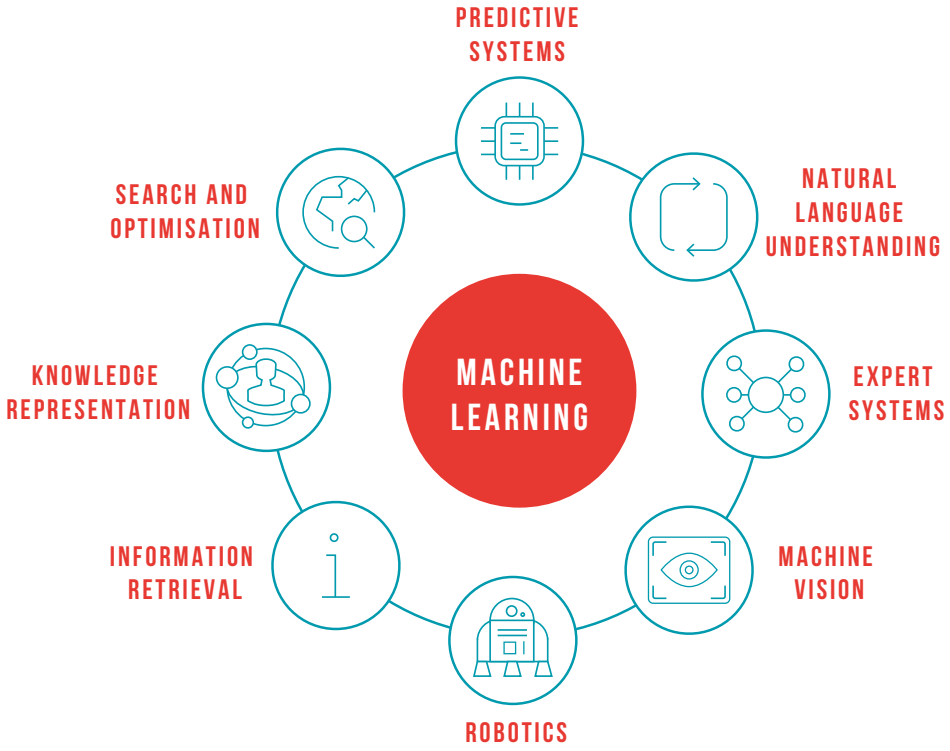
FIGURE 2:
Capabilities of an AI system



Source: Accenture, Enhancing business insights using data analytics and AI, 2018

Machine learning encompasses a class of algorithms that are trained with data rather than explicitly programmed. They are presented with many examples relevant to a particular task, and find patterns in the data that are turned into rules for automating the task. Machine learning has become integral to natural language processing, search and optimisation, machine vision, and is increasingly used in robotic process automation and in many other emerging technologies. These capabilities can be applied in many different business settings and cover a wide range of functions.

FIGURE 3:
Machine learning now supports many AI capabilities



Source: Accenture, AI explained: a guide for executives, 2018

Ethical AI

AI technologies will enable disruptive innovation across every industry, including financial and related professional services. To be successful, companies will need to innovate, while also meeting their obligations on responsibility, transparency and fairness. There is a unique opportunity for companies to differentiate themselves by deploying AI responsibly and sustainably. Ethical AI is the practice of using AI with good intention to empower employees and firms and to impact positively and fairly customers and society – allowing companies to engender trust and to scale AI with confidence.

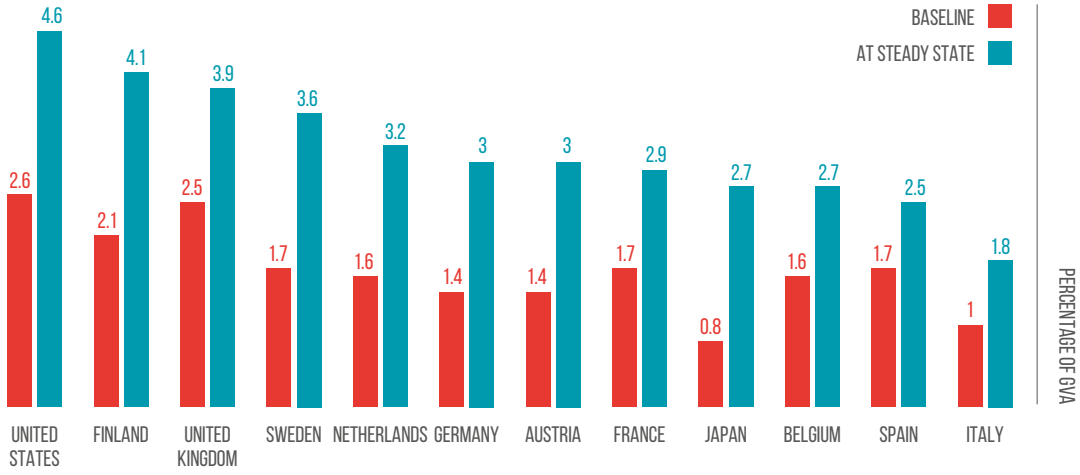
THE OVERALL AI OPPORTUNITY

The global context in brief

The World Economic Forum recognises the value and potential of AI, with many international actors competing to lead in this field.[1] An Accenture study on the impact of AI on 12 developed economies concluded that AI has the potential to double annual economic growth rates across all 12 countries. This would boost labour productivity by up to 40% by 2035 across these economies, enabling people to make more efficient use of their time.[2]

FIGURE 4

The economic impact of AI as a driver for growth, as a percentage of GVA by 2035



Source: Accenture and Frontier Economics, Why Artificial Intelligence is the Future of Growth, 2016
At Steady State – shows the expected growth once the impact of AI has been absorbed into the economy. Real gross value added (GVA)(%, growth). Note: 2035 was chosen as a year of comparison as it takes time for the impact of new technology to feed through.

An Accenture study estimated that AI could add £650bn gross value added (GVA) to the UK economy through a combination of intelligent automation, augmentation of labour and capital investments, increasing the annual growth rate of GVA from 2.5% to 3.9%. As a result, the diffusion of innovation across the economy would result in a 25% increase in productivity.

1 World Economic Forum, 'The Fourth Industrial Revolution: what it means, how to respond.' available at: https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/

2 Accenture, 'Artificial Intelligence is the Future of Growth', (September 2016) available at: https://www.accenture.com/us-en/insight-artificial-intelligence-future-growth

From 2017 onwards, countries including China, Canada, France, and the UK published national AI strategies and initiatives.[3] Countries including Russia, the Netherlands and Estonia are also preparing to launch their own AI strategies and initiatives. The European Union has further encouraged Member States to adopt its shared vision for 'Trustworthy AI'.[4] In many cases, ethics has been the underlying driver for policy frameworks on AI.

The UK context

In November 2017, the UK government published its Industrial Strategy, outlining its approach towards creating an innovative economy with the aim of putting the UK at the forefront of the global AI and data landscape.[5] AI was identified as one of four 'Grand Challenges'. Furthermore, the 'Artificial Intelligence Sector Deal' outlines the implications for investment, the digital skills gap, and the workforce of the future needed to realise the full potential of AI across the UK's economy.

A key recommendation was for the Department for Culture, Media and Sport (DCMS), and the Department for Business, Energy, and Industrial Strategy (BEIS) to set up an Office for Artificial Intelligence to devise policy approaches to AI, as well as the AI Council Centre for Data Ethics and Innovation (CDEI) to advise on regulation, ethics and AI. The Office for Artificial Intelligence and CDEI have launched a series of key initiatives on AI, including an investigation of the potential for human bias in algorithmic decision making in local government, justice and financial services.

The UK has the potential to be a world leader in the AI space based on a vibrant ecosystem of top talent, world-leading AI research centres, a strong technology industry and digital infrastructure, a growing number of AI start-ups, and an effective AI-friendly regulatory and governance context.[6] The strength of the UK's national strategy lies in helping avoid regulatory uncertainty and protecting consumers from potential harms.

3 Dutton, T., 'An Overview of National AI Strategies', (June 2018) available at: https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd

4 European Commission's High-Level Expert Group on Artificial Intelligence, 'Ethics Guidelines for Trustworthy AI', (2019), available at: https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

5 UK Government, 'UK Government's Industrial Strategy: building a Britain fit for the future', (2017), available at: https://www.gov.uk/government/topical-events/the-uks-industrial-strategy

6 Oxford Insights, 'Government AI Readiness Index', (2017), available at: https://www.oxfordinsights.com/government-ai-readiness-index

As the All-Party Parliamentary Group on AI stated in a recent report, "the UK is the best contender for number three (behind the US and China) and has the strong possibility to outcompete the EU, Canada and Southeast Asia (excluding China). The UK is well placed to compete globally in the augmented economy".[7] The UK came second in the '2019 Government AI Readiness Index' which sought to measure the current capacity of governments to seize the potential of AI.[8]

Nevertheless, to compete successfully with countries including China, the United States, Canada, Singapore and Japan, the UK will need to focus on becoming an international leader in specific industries and topics. Relevant industries include healthcare and FinTech, and topics include the development of AI ethics, governance and safety frameworks on a global scale.[9] In the global race for AI success, the UK should focus its efforts on ethical best practices and ethical application of AI as a major differentiator.[10]

7 Deep Knowledge Analytics, `AI in the UK: Artificial Intelligence Industry Landscape Overview Q3/2018', (2018), available at http://analytics.dkv.global/data/pdf/AI-in-UK/AI-in-UK-Executive-Summary.pdf

8 Oxford Insights, 'Government AI Readiness Index', (2019), available at: https://www.oxfordinsights.com/ai-readiness2019

9 Deep Knowledge Analytics, `AI in the UK: Artificial Intelligence Industry Landscape Overview Q3/2018', (2018), available at http://analytics.dkv.global/data/pdf/AI-in-UK/AI-in-UK-Executive-Summary.pdf

10 Hall, W. and Pesenti, J., 'Growing the Artificial Intelligence Industry in the UK.' (2017), https://www.gov.uk/government/publications/growing-the-artificial-intelligence-industry-in-the-uk

THE WAY FORWARD: UNLOCKING VALUE WITH AI

Digital transformation with AI means thinking big, starting small and acting faster than before. The pivot towards becoming an AI-powered business means that leaders need to orchestrate a shift at the level of business and digital strategy, operational processes and organisational culture. Businesses must balance speed, agility and scale. This requires them to focus on the 'brilliant basics' to get AI right: they need to become strategy- and value-driven, put in place strong governance controls, and align their talent management strategy to the broader business objectives.

To help industry leaders to navigate the AI roadmap, we recommend they:

- **Define and deliver value:** get good at defining value. Decide what to focus on – and focus from the top down. But firms must guard against becoming obsolete because they are too busy delivering now to look to the future. They must understand how AI is changing their industry and the world and have a plan.

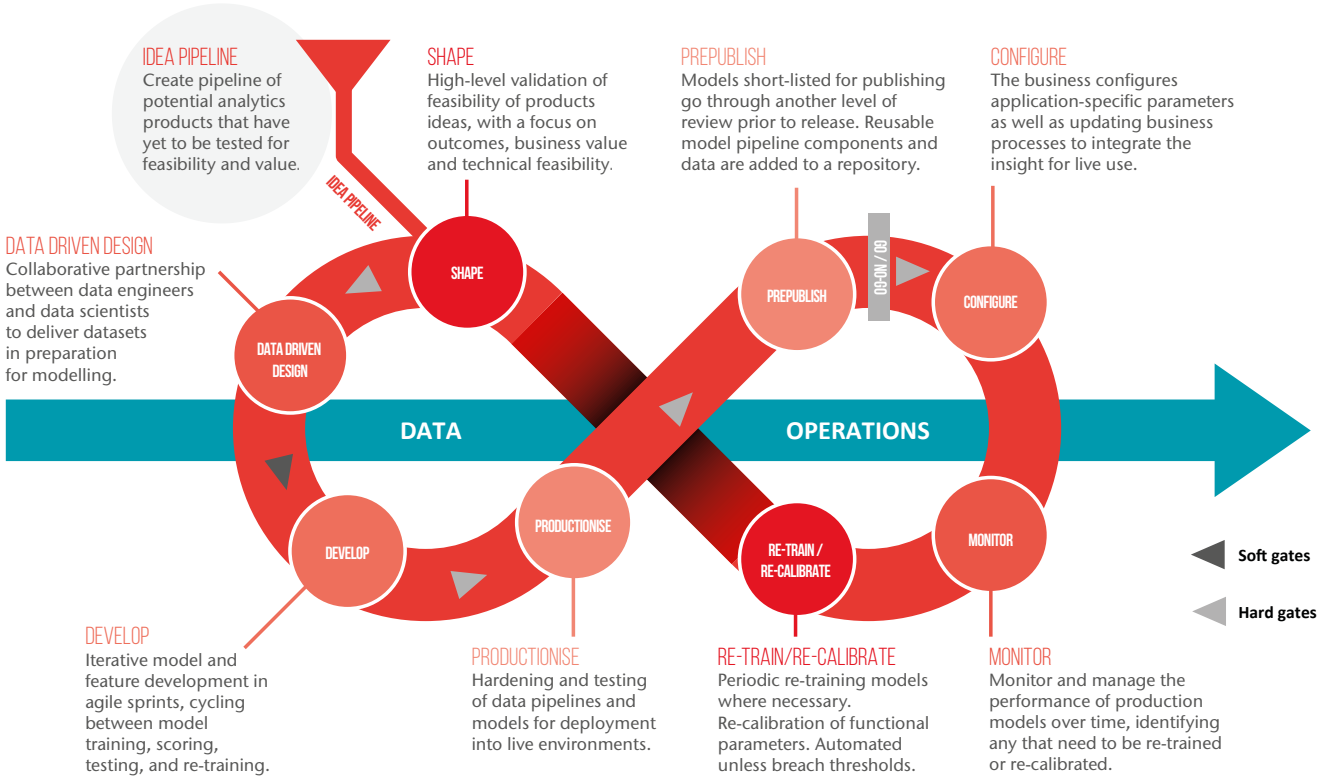
- **Think affordable and easily accessible:** existing tools can be accessed fast for immediate benefit. Firms that succeed in the AI era will be flexible about looking for off-the-shelf tools that meet their needs. The key is to get started fast with the tools that are already available.

- **Scale value:** to scale value in the AI era, firms will need to think big, start small, and prioritise advanced analytics, governance, ethics and talent upfront.

- **Consider people, capability and culture:** winning organisations understand that the robot colleague era will require them to re-establish traditional notions of jobs and activities – so firms should start on new ways of working now.

- **Proceed responsibly and build trust:** to generate trust from the outset, firms should have a view on responsible AI and a blueprint for how to achieve it – this is the key to scaling with confidence and managing risk in the AI era.

FIGURE 5
Formalising the AI lifecycle



Source: Accenture analysis: Formalise the lifecycle for data science, 2019

FIGURE 6
Reconfigured jobs in the AI era

Source: Accenture, Reworking the Revolution, 2018

Accenture's responsible AI framework defines five key considerations that industry leaders need to take into consideration for AI to flourish:

Trustworthy – safe, honest and diverse in perspectives.

Reliable – enabling enhanced judgement and making better decisions.

Understandable – interpretable and transparent decision making.

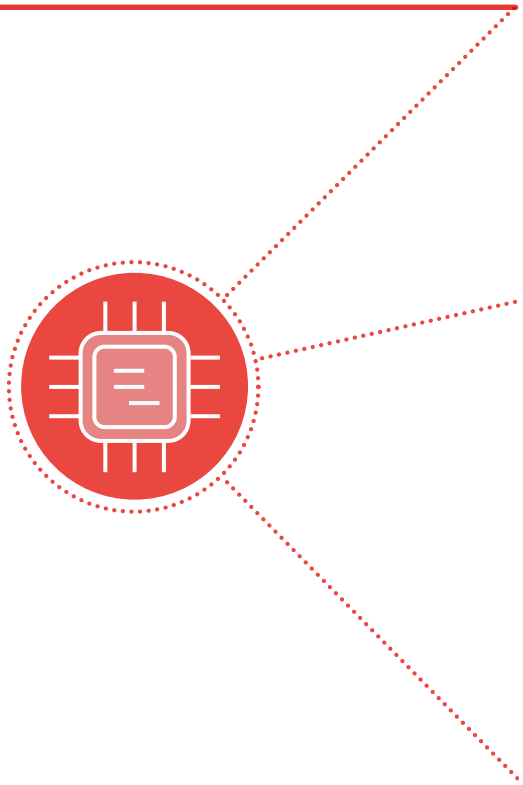
Secure – privacy-by-design for firms, data and customer information.

Teachable – human-centric design for humans and machines.

THE AI OPPORTUNITY FOR THE UK-BASED FINANCIAL AND RELATED PROFESSIONAL SERVICES INDUSTRY

The UK-based financial and related professional services industry is responsible for over 10% of economic output and employs nearly 2.3 million people. It is therefore of great economic importance. But the industry is dealing with a host of challenges:

- The need to process vast quantities of data within a complex, regulated environment.
- Stagnant and/or shrinking revenue pools slowing down the growth of key market players.
- A changing industry landscape, as conventional financial services institutions are facing disruptive competition from technology-driven new market entrants.
- Changing customer expectations about personalisation of products and services driving digitalisation and adoption of emerging technologies.
- Complex regulatory landscape and increased regulatory scrutiny on the use of digital technologies and their impact on business models and customers.



Given its importance to the UK economy, the rollout of AI in this industry has major implications for UK international competitiveness.[11] AI adoption is accelerating and there is a particularly strong appetite for it within financial and related professional services. This has been driven by the wider shifts in how the industry operates and the need to process vast quantities of data – something machine learning systems excel at. Collaboration and partnership with the FinTech, RegTech, and LawTech communities to realise these opportunities has become a widespread and rewarding practice. Sustaining and growing adoption must be prioritised and become a key strand of UK international trade policy. Harnessing its regulatory and market strengths, the UK could and should leverage AI to boost its broader economic competitiveness.

Continued success in this industry depends on being able to enhance value capture from existing sources and unlock new sources of value. In a macroeconomic environment that has proved challenging for many services institutions to drive new growth and to better leverage existing revenue streams, AI has the potential to deliver on these promises.

AI is reinventing how financial and related professional services companies operate and compete. AI creates tangible business outcomes through the ability to autonomously learn, adapt, and improve – at increasingly lower costs.

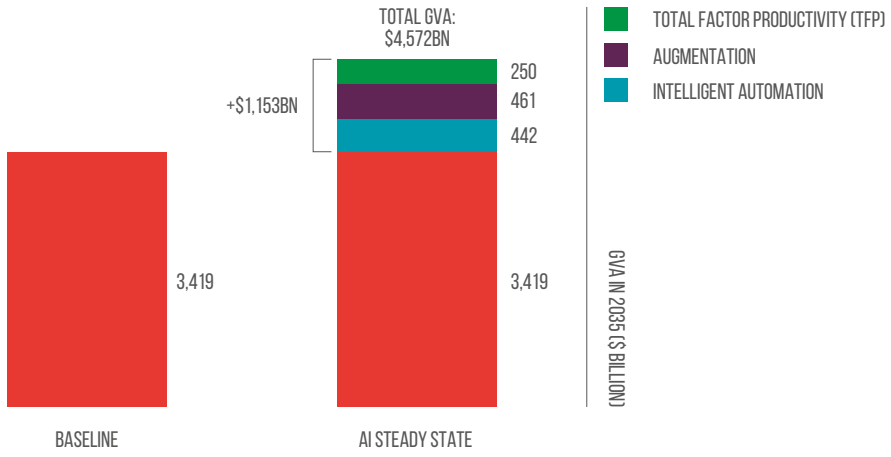
Moreover, AI has the potential to help the industry grow. Financial and related professional services, together with information and communication and manufacturing, is among the top three industries that will benefit most from the application of AI.[12]

11 TheCityUK, 'Key facts about UK-based financial and related professional services', (May 2019) available at: https://www.thecityuk.com/assets/2019/Report-PDFs/b258573748/Key-facts-about-UK-based-financial-and-related-professional-services-2019.pdf

12 Accenture, 'How AI Boosts Industry Profits and Innovation,' (2017), available at: https://www.accenture.com/us-en/insight-ai-industry-growth

FIGURE 7

How AI can boost the financial services sector's profits and innovation



Source: Accenture, How AI Boosts Industry Profits and Innovation, 2017

AI will also help business leaders drive innovation and unlock trapped value in the core businesses and beyond. Financial services institutions will reap the benefits of adopting AI by improving customer experience, providing new products, detecting and preventing money-laundering activities, managing risk, and meeting regulatory requirements. Fundamentally, the UK-based financial and related professional services industry relies on data-driven insights to inform decision making and AI is a tool that enables fast decisions at scale.

Applying AI: the industry-specific context

To harness the full value of AI, UK-based financial and related professional services companies must consider this breadth of potential and embed AI and other enabling technologies across their operations and structures. This requires a new approach, designed to enhance and transform capabilities in five key areas:

1. **Systems and processes:** augmenting ongoing process automation efforts with self-learning and self-optimising systems and processes, including the ability to interpret unstructured content (e.g. contracts, client communications via document, phone, text, etc.) as input.

2. **Human judgement:** augmenting human decision making with AI-based predictive models (e.g. credit, risk, stress, valuation) and proactive recommendations (e.g. next best action/offer).

3. **Digital interactions:** transforming digital channels to support more human-like interactions and scaling high-touch channels through the addition of AI-powered team members (e.g. Amazon's Alexa).

4. **Products and services:** using AI to capitalise on opportunities – previously too complex or costly – that enrich existing capabilities, provide new capabilities, or allow institutions to address previously unreachable markets.

5. **Transparency and trust:** using AI to protect institutions and their consumers, while increasing transparency. Current efforts include enhanced computer security, fraud detection and enhanced stress testing.

KEY FINDINGS: THE POTENTIAL AND ADOPTION OF AI

At the highest level, four key insights emerged from the IRSG and Accenture research:

1. There is substantial potential for AI to disrupt and transform the UK industry

Our findings highlight the substantial potential of applying AI tools to use cases across the industry:

- **Higher revenue growth:** AI will create new business models, products and services and will allow companies to reach new customer segments.
- **Increased cost savings:** AI will enable greater efficiency across business operations.
- **Improved customer experience:** AI-powered institutions will be able to rapidly deliver highly customised service offerings for new and existing target segments using omni-channel experiences.
- **Better risk mitigation:** AI will boost the quality and speed of risk management, fraud prevention and other compliance activities and practices.

A 2018 global executive survey found that AI adoption had gained significant momentum across different sectors, including financial services.[13] Across the various sectors within the UK-based financial and related professional services industry, firms are accelerating their adoption of AI and are achieving tangible results. From chatbots to document management to fraud detection, AI is gaining traction and credibility – an insight echoed by the IRSG and Accenture research. The business and technology leaders interviewed for this report had either included AI in their strategic roadmap or had already prototyped or embedded AI within the firm.

13 Accenture, SAS, and Intel with Forbes Insights, 'AI Momentum, Maturity & Models for success.' (2018) available at: https://www.accenture.com/t20180919T202227Z__w__/us-en/_acnmedia/PDF-86/Accenture-AI-Momentum-Final.pdf

2. Organisations are generally in the initial stages of AI adoption

Despite this significant momentum in AI adoption, a consistent finding from the research is that the maturity of AI solutions in financial and related professional services varies widely depending on the sector and the type of customers served by the firm. Most business and technology leaders interviewed acknowledged that their AI projects were at the prototyping stage – firms are experimenting with AI technologies and with AI Proof of Concepts. A few financial institutions were taking their first steps towards scaling AI across their organisation.

3. The holistic applications of AI are not yet well understood

The research indicates that industry leaders view AI-enabled digital transformation in two fundamental ways. A high number of respondents suggested that AI is a set of technologies serving a specific purpose such as cost cutting to enhance operational efficiency. For example, some praised AI's ability to find bottlenecks in legacy systems. Another respondent emphasised how financial services institutions have been successfully using algorithms for a while now, and in this sense "AI is an evolution, not a revolution". What is fundamentally different today is that AI allows firms to operate at a larger scale and to have a higher impact than was previously thought possible.

On the other hand, another interview respondent likened AI to digitisation, a general purpose technology. For example, a financial services institution is applying AI across its entire suite of products, services and operations. Hence, the business is gaining horizontal capabilities in AI rather than restricting the use of AI to a specific area. This finding reflects a suggestion by a business leader that firms need to stop thinking of AI as an operational efficiency tool. Instead, firms need to transform existing business models and to allow the formation of new AI-based paradigms and models.

"AI IS AN EVOLUTION, NOT A REVOLUTION."
INTERVIEW RESPONDENT

4. Consistent perceptions expressed around the barriers to adoption

The research shows some consistent perceptions around the barriers to further adoption of AI.

- **Definition of AI:** the lack of clarity and consensus about the definition of AI technologies is creating confusion in situations ranging from funding discussions to regulatory engagements. The lack of a common, standardised definition of AI acts as an inhibitor to adoption.

- **Expectation gap:** there is a gap between what is expected of AI and what it can deliver in practice. This gap, if not properly addressed, might create unrealistic expectations of AI and hamper efforts to scale AI across an organisation.

- **Scalability:** another factor hindering adoption of AI is the difficulty that arises when firms attempt to scale AI systems initially developed on closed platforms, which do not perform well when applied to the rest of the business.

- **AI talent gap:** despite fears of automation-driven unemployment, the rise of AI has created new roles and opportunities across the industry. Most respondents highlighted the existing AI talent gap as a key barrier to transitioning AI systems from concept into implementation across their organisation. Firms are struggling to fill their positions as the existing AI talent pool cannot meet the high demand.

- **Public perception:** the AI public debate has been heavily influenced by the possible negative impacts of technology on employment and privacy, as opposed to the societal benefits. However, the leaders interviewed highlighted the positive impact of automation on work. AI's ability to elevate roles, allowing employees to focus on value-add activities should be communicated more effectively. For example, in areas where machines and humans work in parallel, there are currently no fears that AI will lead to job losses. It is envisaged that AI systems will not run independently without human supervision and that instead they will be monitored and controlled by technical specialists through a 'human-in-the-loop' model.

To overcome these barriers to AI adoption, firms will need to develop and deploy fair and transparent AI systems that respect security and privacy-by-design principles and that are underpinned by a strong governance framework to maintain the integrity of the financial system.

In the following sections we discuss in-depth findings and recommended best practices for the industry based on four key themes:[14]

- AI fairness, transparency and consumer protection
- data privacy and security
- governance
- ecosystem resilience.

14 The impact on the workforce and the associated topic of AI skills emerged as a fifth theme early in the research process. These topics were deemed out of scope for this research project given the existence of a significant number of thought leadership materials covering these topics.

AI fairness, transparency and consumer protection

The debate on AI ethics has captured the attention of government, industry leaders, academics and the wider public. With the adoption of AI advancing rapidly, companies are focusing on designing and deploying ethical and responsible AI technologies. The fairness of AI systems has come under scrutiny in the context of some companies' AI-powered business models that rely on customer data and the apparent bias of some AI solutions.

Governments and organisations have explored various approaches to solving AI bias and have proposed principles for AI fairness. In 2016, the IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems proposed a series of principles for the ethical use of AI.[15] In March 2019, the European Commission published a set of Ethics Guidelines for AI, a framework for the wider AI community to develop and apply AI responsibly and ethically.[16] The Government Digital Service and the Office for AI published joint guidance on how to build and use AI in the public sector.[17] The guide identifies a number of factors to consider for government departments, including AI ethics and safety.

In financial services, principles for AI fairness are likewise being devised and tailored to the sector. In January 2019, the Monetary Authority of Singapore published principles to promote Fairness, Ethics, Accountability and Transparency in Singapore's financial services. The publication of this set of principles is a landmark initiative, as it is believed to be the first set of guidelines on AI issued by a central bank or financial regulator. The high-level guidelines serve as a foundational framework for firms to apply AI responsibly. In March 2019, the UK's CDEI launched a new investigation to explore the potential for bias in crime and justice, financial services, recruitment and local government.[18]

In practice, firms are relying on the power of data-driven algorithms to gain a deeper understanding of their customers and to enable hyper-personalisation of services and products. Algorithmic decision making can lead to more data-driven, objective and fairer decisions compared to humans, but it can also result in discrimination and incorrect outcomes. Moreover, with the right technical tools and methodologies it is possible that bias in AI could be corrected more quickly and easily compared to human bias. Although it may be difficult to ensure all decisions made are free of any kind of bias, research on methods to identify, mitigate and reduce potential AI biases is a critical field of study.

15 The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, `Ethically Aligned Design', (December 2016) available at: https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/ead1e.pdf

16 European Commission's High-Level Expert Group on Artificial Intelligence, 'Ethics Guidelines for Trustworthy AI', (April 2019) available at: https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

17 UK Government, 'A guide to using artificial intelligence in the public sector', (2019), available at: https://www.gov.uk/government/collections/a-guide-to-using-artificial-intelligence-in-the-public-sector#using-artificial-intelligence-ethically-and-safely

18 UK Government, 'Investigation launched into potential for bias in algorithmic decision making in society', (March 2019) available at: https://www.gov.uk/government/news/investigation-launched-into-potential-for-bias-in-algorithmic-decision-making-in-society

Bias can be introduced into AI systems through three main channels: data, programming and training. Firstly, bias in data can arise from errors in data sampling if a given sample is not representative of the target data. Secondly, incorrect or unfair outcomes can arise because of using models that rely on biased input data and propagate biases in the output. Unchecked assumptions, or pre-existing institutional or cultural norms embedded within data sets can lead to biased outcomes. Finally, incomplete or insufficient datasets used at the training stage could produce misleading or incorrect conclusions.

The feedback received from participating firms indicated that the majority were confident that AI biases are well understood and mitigated by rigorous internal governance and controls. For example, most firms have established safeguards and oversight structures and frameworks covering all the stages of the AI lifecycle. It was noted that sampling was a particularly important method for monitoring AI systems' outcomes and protecting against incorrect outcomes.

Additionally, many firms have adopted a 'human-in-the-loop' approach which allows human decision-makers to override the AI systems when necessary. For example, at a leading professional services firm, analysts' work is augmented by a machine learning system. Although the firm's ambition is to expand beyond the pilot and to embed AI across the business, it is envisaged that AI systems will not run independently without human supervision. Instead, AI systems will continue to be monitored and controlled by technical specialists.

In addition to the 'human-in-the-loop' approach, it was proposed that diversity across and within teams would be a way to safeguard against AI bias. Many financial services institutions are taking active steps towards increasing the diversity of their technical and business teams.

A more complex issue arises where the adverse outcome is not the result of bias, nor even technically incorrect, but where the outcome was simply not one which was originally envisaged by the firm. Continuous learning and feedback helps AI improve its outputs, but over time can result in an output which was not initially envisioned. In the case of unanticipated outcomes, safeguards need to be in place to catch and flag any potential risks. Firms need to consider instances when an outcome might deviate from initial expectations and when the outcome could no longer be relied upon. While every firm will set its level of risk appetite, interview respondents suggested that parameters specifying the range of valid and acceptable outcomes would need to be agreed prior to AI development and deployment.

Transparency and explainability

Transparency has emerged as one of the top strategic trends within the ethics of AI.[19] Transparency – the cornerstone of individual informed consent – is a key requirement in the General Data Protection Regulation (GDPR). The GDPR requires transparency and explainability for certain types of automated decision making.

Chatbots and robo-advisers in Asset Management

In asset management where AI powered virtual agents are being rapidly adopted, firms are dealing with the practical aspects of transparency. Conversational AI refers to the use of messaging apps, speech-based assistants and chatbots to automate communication and create personalised customer experiences at scale. Robo-advisors can lower operational costs for firms and increase financial participation and inclusion for consumers. Today virtual agents represent an exciting opportunity; tomorrow they will be a competitive necessity and a basic expectation for the digital customer.

19 Gartner, '5 Trends Emerge in the Gartner Hype Cycle for Emerging Technologies' (August 2019) available at: https://www.gartner.com/smarterwithgartner/5-trends-emerge-in-gartner-hype-cycle-for-emerging-technologies-2018/

The opacity of AI systems has led to AI becoming associated with the term 'black box'. AI technologies can consume large amounts of data in near real time without necessarily revealing their underlying computational processes. Fundamentally, the issue is to connect input to output – dataset and algorithm to outcome – and to explain the nature of these links to the end user who relies on the accuracy and validity of the outcome.

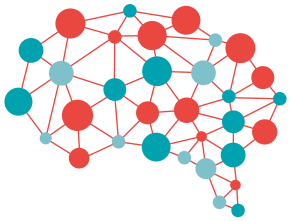
Explainability and transparency are different. Transparency can be understood as the ability to provide insights into the nature of AI systems that are enabling data-driven decision making. On the other hand, explainability refers to the ability to provide a rationale for the decisions made by AI solutions, specifically machine learning models such as neural networks. Explainability is key to help users understand how AI systems are developed, trained and deployed.

It was noted that while firms must demonstrate transparency to build trust in AI, unintended consequences can result from requirements for disclosure. For example, disclosing commercially sensitive data may undermine competitiveness, while the publication of algorithms may challenge financial stability. A key consideration is protecting intellectual property and preventing potential malicious actors from exploiting vulnerabilities in the system based on openly shared data and models. Regarding the latter, it was noted during the interviews that the mandatory publication of catastrophe modelling algorithms under the Solvency II Directive had seen the insurance industry coalesce around two catastrophe modelling systems i.e. Risk Management Solutions and AIR Worldwide, which challenged competition.

The research indicated a difference of opinion regarding the level of openness required in the process of engaging with consumers and clients. Leaders interviewed thought it was important for financial services providers to be transparent with consumers around how data is being used, the way in which data would be processed and the range of possible outcomes. A couple of respondents proposed that a general notice akin to "your investment may go down as well as up" be provided for AI-derived outcomes and recommendations.

Although AI is being embraced by both industry and government, widespread adoption depends on trust. Firms are fostering greater public trust by embedding fairness, transparency and accountability in their design, development, deployment and monitoring of AI systems, and by communicating the impact of AI on end users.

High-level principles for transparent and explainable AI would help to steer and guide firms as they adapt their operations. Firms need to translate high-level ethical AI principles into their own business strategies.



INDUSTRY RECOMMENDED BEST PRACTICE

AI fairness, transparency, and consumer protection

Design, deploy and monitor auditable AI systems which are underpinned by robust checks and controls, including periodic sampling of end outcomes. This would help firms to set parameters for using the outputs of AI systems with confidence and would help reduce or eliminate the risk of unintended consequences.

Develop an ethical AI framework aligned with core corporate values and with wider industry standards and best practices. This would help firms by providing clarity on what information is required for consumers and clients.

Data privacy and security

Data – the lifeblood of AI – is a fundamental asset of the digital economy. AI requires and is dependent on data to train, learn and act. A key consideration is to ensure that data underpinning AI is available, accessible and accurate to increase the rate of AI successes.

In Accenture's 2018 'Technology Vision', 82% of executives surveyed reported that their organisations were increasingly using data to drive critical and automated decision making at unprecedented scale. Seventy-nine per cent of executives agreed that organisations were basing their most critical systems and strategies on data, yet many had not invested in the capabilities to verify the truth within it.[20] Data quality matters. To ensure data veracity and data integrity companies can leverage digital technologies.

Financial services institutions gather and leverage large quantities of data and can derive significant benefits from AI-based services and products. At a time when the public does not place trust in how some industries approach data privacy, the financial services sector can demonstrate good data management practices to build and enhance trust. Moreover, the fact that firms hold these substantial pools of data is a unique competitive advantage. The real issue to be addressed is how to break down organisational silos to enable access to high quality data.

The UK government recognises that data is the infrastructure for AI and that it provides a fundamental framework for AI systems to function: "As organisations, including financial and health services providers, increasingly perceive individuals as the aggregation of data gathered about them (sometimes called their 'data selves'), it is essential that data be accurate, up-to-date and processed fairly and lawfully, especially when processed by algorithm".[21]

This approach is regulated by the GDPR which is fundamentally changing the way we see data and is cementing data as the currency of the digital economy. The GDPR focuses on protecting consumer data and seeks to remove risks to individual privacy and safeguard consumers against unfair or prejudicial actions and incorrect outcomes. The GDPR introduces new requirements around accountability, documentation, privacy design and reviews, and it imposes substantial fines for non-compliance.

The GDPR brings a host of benefits:

- **Consumer:** transparency around how personal data is being used and greater control over the processing and sharing of personal data.

20 Accenture, 'Technology Vision', (2018) available at: https://www.accenture.com/_acnmedia/Accenture/next-gen-7/tech-vision-2018/pdf/Accenture-TechVision-2018-Tech-Trends-Report.pdf#zoom=50

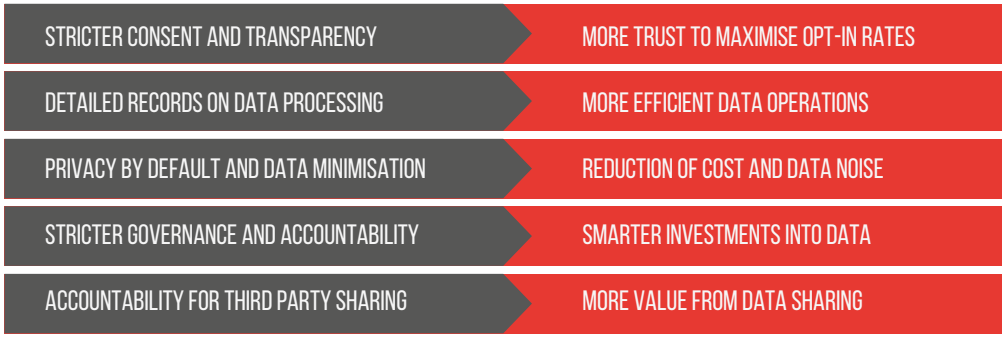
21 House of Lords Select Committee on Communications, 'Regulating in a Digital World.' (February 2019) available at: https://publications.parliament.uk/pa/ld201719/ldselect/ldcomuni/299/299.pdf

- **Business:** increased value from consumer data, competitive advantage as a trusted brand and improved data quality and data operations.

- **Industry:** increased accountability for consumer data processing, digital single market enablement and decrease in misuse of consumer data.

With the advent of the GDPR, firms have an opportunity to rethink their approach to customer data and to seize the opportunity to secure better trust by showing consumers how their data is protected, kept secure and used judiciously.

FIGURE 8
From GDPR compliance to opportunity



Source: Accenture, A new slice of PII, with a side of digital trust, 2017

Due to AI systems' dependence on vast amounts of data, it has been argued that the GDPR is the main regulation that both directly and indirectly impacts the development and application of AI.[22] There are several GDPR provisions that relate to AI:

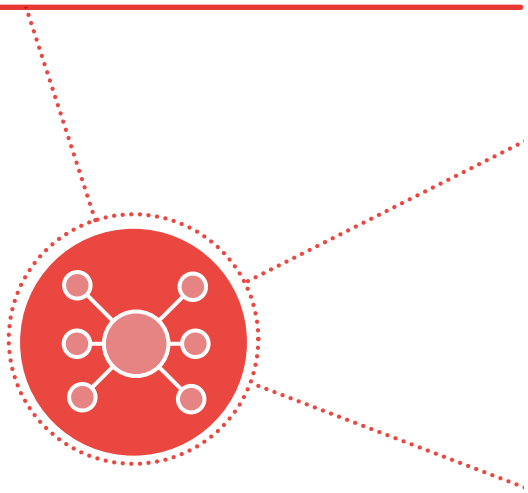
- **Article 22 Rights related to automated decision making including profiling:** this article applies to decisions derived exclusively as a result of automated processing – decisions which would have a legal or otherwise significant impact on the data subject. Firms are required to have a human review certain algorithmic decisions which in practice might result in higher costs including labour costs.

- **Articles 13-15 Right to explanation:** under this provision, firms are required to provide 'meaningful information about the logic involved' in algorithmic decisions covered by Article 22. However, the GDPR does not clarify whether 'meaningful information' refers to the general method by which algorithms reach decisions or to the in-depth explanation of individual algorithms.

SEVENTY-NINE PER CENT OF EXECUTIVES AGREED THAT ORGANISATIONS WERE BASING THEIR MOST CRITICAL SYSTEMS AND STRATEGIES ON DATA[23]

22 Center for Data Innovation, 'The Impact of the EU's New Data Protection Regulation on AI', (March 2018) available at http://www2.datainnovation.org/2018-impact-gdpr-ai.pdf

23 Accenture, 'Technology Vision', (2018) available at: https://www.accenture.com/_acnmedia/Accenture/ next-gen-7/tech-vision-2018/pdf/Accenture-TechVision-2018-Tech-Trends-Report.pdf#zoom=50



- **Article 17(1) Right to erasure:** the 'right to be forgotten' or the 'right to erasure' grants individuals the right to have personal data erased. The right is not absolute and only applies in certain circumstances. Given that machine learning systems learn from large amounts of data, it could be difficult in practice to trace the source of a dataset that 'fed' the algorithm. Erasing unique datapoints could negatively impact the accuracy and performance of AI systems.

- **Article 6 Data minimisation:** the principle of data minimisation as applied to data processing requires that firms use the minimum amount of personal data needed to achieve a specific outcome. However, in practice, it may be difficult for firms to reconcile AI's dependence on large data sets and the need for data to be gathered for a specific purpose.

- **Article 20 Right to data portability:** under this provision, individuals are given the right to obtain and use their personal data for their own purposes across different services. There is significant benefit to consumers and markets if data can be shared more widely. However, it may be difficult and costly for firms to provide large, potentially sensitive data sets.

There is a need for more consideration of the one-size-fits-all approach to data privacy and the potential missed opportunity from data aggregation for wider societal benefit. Regulators need to consider a trade-off between individual interests and societal benefit from data aggregation. Communicating to data owners the benefits at stake and the protections in place will be key to ensuring public buy-in.

Data generation and sharing

Over recent years, financial services institutions have established and run extensive data governance programmes. These programmes have generated benefits for customer service, decision making, regulatory compliance, risk management, mergers, acquisitions and divestitures. However, there is little standardisation as firms take different approaches to data governance.

A respondent described data usage and sharing as the biggest challenge facing AI deployment. Data governance will become a key component of AI development and deployment in the financial and related professional services industry.

According to Accenture's 2019 'Global Financial Services Consumer Study', financial services customers were more willing than ever to share data – if data-sharing powers integrated propositions and offers were tailored to their needs. Importantly, it was found that consumers were willing to share their data with their financial services providers in return for better advice and more attractive deals.[24]

24 Accenture, '2019 Global Financial Services Consumer Study', (2019), available at: https://www.accenture.com/t20190314T112405Z__w__/us-en/_acnmedia/PDF-95/Accenture-2019-Global-Financial-Services-Consumer-Study.pdf

Data sharing has, in recent years, been based on the principle of consent, with permission for data sharing incorporated into the underlying contractual relationship and consumers granted the right to be forgotten when they wish to withdraw that consent. Often the principle of consent may be difficult to translate in practice. Interviewees flagged that increasingly the contractual basis of consent is in decline with clients having these clauses removed.

While none of the respondents sought a major departure from the GDPR, on the issue of data sharing there were calls for guidance on several specific issues. For example, the GDPR's 'legitimate interest' basis for data processing could be expanded. More broadly, the regulator could provide greater clarity on who would be responsible/accountable if a third party relies on historic data obtained through Open Data which later turns out to be inaccurate. As more data propagates outside organisational boundaries under the Revised Directive on Payment Services (PSD2), firms need to better assess, measure, and manage security and privacy risks including third party risk. A strong data supply chain will help improve data lineage, allowing data to flow through the chain effectively and efficiently. Another consideration is to tighten the link between privacy and security compliance – privacy without security is impossible.

Another area of consideration is cross-border data sharing, particularly sharing of financial crime data between international banks. Currently, international banks are not able to share data on criminal activity across the different jurisdictions they operate in. The development of a Trust Framework for data sharing was proposed as a tool to help firms to detect, analyse, disseminate and report information on criminal activity at a faster rate.

It was also highlighted during the interviews that regulatory restrictions on data sharing could produce fewer desirable outcomes or could even harm consumers as firms could be inclined to provide generic advice rather than tailored recommendations. Similarly, the inability to gather and analyse data on gender, age and racial background may lead to the use of proxies which could hide a bias in the algorithm. Balancing privacy requirements and the need for more data for AI needs further consideration.

Part of the response, according to some respondents, was the need for consumer incentives/rewards to be factored into Open Data. This could be incorporated into ongoing regulatory initiatives around Data Trusts. The UK's 2019 AI Sector Deal signalled the government's appetite to explore Data Trusts.[25] To that end, a partnership between the Office for Artificial Intelligence – a team which spans the DCMS, and BEIS – and the Open Data Institute was announced in early 2019 to explore how data trusts could improve access to data while also preserving trust.[26]

Intelligent underwriting in insurance

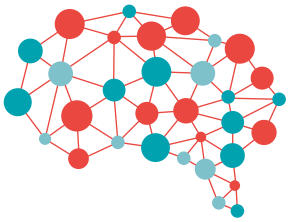
At large insurance firms AI systems benefit from a wealth of consumer data including age, job, marital status and financial lending or; insurance results, including previous defaults, repayment schedule and car accidents. Applying AI to existing datasets would enable companies to improve their risk management using predictive analytics and to price their products and services for different consumer segments more accurately.

25 UK Government, 'Artificial Intelligence Sector Deal', (May 2019) available at: https://www.gov.uk/government/publications/artificial-intelligence-sector-deal/ai-sector-deal

26 UK Government, 'Digital Revolution to use the power of data to combat illegal wildlife trade and reduce food waste', (June 2019) available at: https://www.gov.uk/government/news/digital-revolution-to-use-the-power-of-data-to-combat-illegal-wildlife-trade-and-reduce-food-waste

Data trusts are an approach to data stewardship that improves different parties' access to data. Data trusts would create a system for pooling and sharing data between different organisations, including government departments and private entities, to allow them to share data safely, fairly and ethically. Despite security and competition concerns of data trusts confer a clear benefit: the flow of data between organisations in a secure, ethical and fair way based on mutually beneficial data sharing agreements. A partnership between government, regulators and industry is key to ensuring the success of new data sharing frameworks.

In the new digital economy, firms will leverage data to innovate and build and maintain digital trust. The winning financial institutions of the future will put data at their core by acting on a comprehensive data approach aligned with the UK's upcoming National Data Strategy, which will allow them to thrive in the digital economy.[27] Data-driven business decision making will create a new digital financial services ecosystem.



INDUSTRY RECOMMENDED BEST PRACTICE

Data privacy and security

Create a set of data ethics principles for the collection, processing, aggregation and sharing of customer information to build digital trust. This would help enhance public trust in AI and improve the public perception of the capabilities, benefits and risks of emerging technologies, and their wider impact on society.

Update risk frameworks to incorporate contingency plans for incorrect outcomes associated with a range of inputs, including the use of inaccurate historic data. Firms should understand the scope for the use of aggregated historical data that could be used to generate new data sets.

Partner with regulatory bodies to further explore opportunities to set up new data sharing infrastructure including Data Trusts. Some firms were in favour of an extension of data sharing rights with third parties.

27 UK Government, 'National Data Strategy open call for evidence', (2019), available at: https://www.gov.uk/government/publications/national-data-strategy-open-call-for-evidence

Governance

AI is upending traditional business models, processes and structures. Firms will need to become more agile and responsive if they are to manage a digital workforce and keep pace with regulatory demands, while also transitioning to new ways of working and embracing disruptive technologies.

Achieving this vision requires firms to identify appropriate governance structures and frameworks. Unsurprisingly, rapid advances in AI-powered innovation are pushing AI governance further up the agenda for many business leaders.

Firms are proactively addressing a set of governance challenges that AI poses:

- **Oversight and control of automated systems:** AI systems are empowered to make inferences and decisions in an automated way without human involvement.
- **Accountability and liability:** considering the complexity and the impact of AI systems on a high number of internal systems and business processes, there might be a lack of internal ownership and accountability in case of outage and/or unexpected outcomes.
- **Technology literacy:** there are concerns that not all stakeholders – including the Board – involved across the AI sign-off process have sufficient knowledge and understanding of AI technologies.
- **Standardisation:** there are currently no regulatory standards related to the corporate governance of AI, and as a result there is a lack of consistency across the industry.

Corporate governance

There has been a lot of debate around whether the deployment of AI technologies present a challenge to traditional governance models, which entail a line of accountability up to senior management. Respondents thought that currently the level of tech literacy across Boards was not sufficient and that it called into question the governance approach. Due to increasing collaboration between technology and business, the traditional approach taken by Boards to delegate technology matters to a Chief Technology Officer is no longer fit for purpose.

Yet, requiring Boards to be have deep technical skills may not be the right solution. Instead, a more useful objective would be to define the level of 'tech literacy' necessary for the Board to fulfil its oversight responsibilities. One of the interviewees noted that "tech literacy is not a point objective, instead it is a bound objective". In practice, the level of AI literacy required for members of the digital workforce would be set based on the requirements of their role and responsibility rather than on an absolute standard. While Boards need to understand how

AI impacts their business at a higher level, digital workers require a deeper understanding of design assumptions, risks, vulnerabilities, and technical aspects of AI. Guidance from the regulator should focus on the factors to be considered by the Board in their decision making process with regards to developing or deploying AI.

One of the key factors is the level of risk the business wishes to take in the case of AI. Given the technology will typically provide a recommendation based on probability, it is for the Board to decide at which point approval should be granted. In this regard, the key decisions for the business on AI deployment are akin to traditional business solutions. A key decision is whether the business wishes to keep AI in a purely supplementary role or bring it fully front-of-office, the latter would secure more benefit but demand greater risk management.

More ambitiously, a leading bank has created new AI governance structures, including an ethical AI charter and AI review panels, to provide guidelines on how to design and build ethical AI systems that align closely with core organisational values. In this context, firms have an opportunity to create new roles and responsibilities. For example, an AI regulatory and risk practitioner role would add value by translating/mapping code to regulatory requirements.

Boards, senior and middle management and technical teams will need to work closer, communicate better, and develop an understanding of both the technical and business aspects of implementing AI. It was suggested that a way to bridge the gap might be for a Chief Technology Officer to place direct reports into the tech teams developing AI products and processes, with responsibility for monitoring and reporting the application of checks and controls.

A solution to the issue of AI control was proposed by some respondents: designing AI systems with 'fail-safe buttons' that can control or shut off the system in emergency situations. The 'fail-safe button' approach to AI safety is a metaphor for controlling AI systems and it encompasses policies and procedures for business continuity and disaster recovery. Firms need to ensure that they have robust contingency frameworks in place to ensure operational resilience.

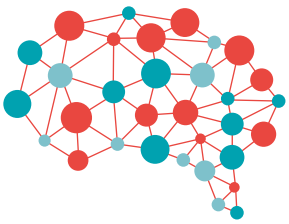
Accountability

Who is accountable for the decisions made by AI systems? The answer to this question is an increasingly complex one. AI accountability refers to the need to go beyond explaining the outcomes and actions of an AI system to ensuring that responsibility is assigned and taken for those outcomes and actions. Accountability encompasses concepts including transparency, explainability, responsibility and legal liability. Ethical AI is based on the concept of human responsibility for outcomes and actions of AI-powered systems. Good governance includes organisational structures and processes for review and oversight that allow firms to explore AI within safe boundaries and assign accountability for AI-powered systems.

A key finding from the research is that existing legal frameworks are adequate for the purposes of assigning accountability in the financial services sector. SMCR is a useful framework to assign accountability to senior leaders in a financial services institution [28]. However, the challenge is ensuring both end-to-end traceability and quality of information that flows into data-driven decision making. This is a difficult task due to the complexity of chains of command and industry leaders interviewed were seeking reassurance that the application of AI does not challenge existing, well-established lines of accountability.

Furthermore, several respondents sought reassurance that the duty of care principle applies when dealing with a third party for AI products and services. The provider and user share responsibilities for AI systems that malfunction and produce incorrect outcomes, in the same way as humans are accountable for those caused by human error.

A set of governance best practices for the ethical development and deployment of AI will help guide firms on the path to digital transformation.



INDUSTRY RECOMMENDED BEST PRACTICE

Governance

Improve digital capabilities/tech literacy opportunities across the organisation and at the Executive Board level to ensure accountability. The potential for AI to be embedded across the entire business requires a shift in corporate oversight from the traditional approach of delegating tech matters to a Chief Technology Officer or equivalent figure.

Review roles and responsibilities for AI within the existing accountability framework and designate formal responsibility for AI governance. Firms require certainty that the application of AI does not challenge traditional accountability lines.

28 Financial Conduct Authority, 'Senior Managers and Certification Regime', (July 2015), available at: https://www.fca.org.uk/firms/senior-managers-certification-regime

Ecosystem resilience

Regulators need to understand whether AI systems are likely to disrupt in a way that would destabilise or negatively affect UK or international financial ecosystems. Data is critical for the business operations of financial services institutions; it is possible that in the long term high data volumes and the data storage approach may present a potential systemic risk. It was noted that a repository approach with firms holding high volumes of data for long periods increased the likelihood of consumer data being compromised through cybercrime or data leaks. Mitigating this risk would require greater collaboration and wider coordination between both national and international regulators, particularly the Financial Conduct Authority (FCA) and the Information Commissioner's Office (ICO).

In the long term, greater standardisation and harmonisation driven by AI adoption could increase cyclical risks given the reliance on shared approaches and on similar technologies. By contrast, opponents of this view argued that there would be significant diversity and choice in AI technologies and tools. For example, an international banking group mitigates systemic risk by creating a set of group-wide, global products that are then adapted to suit local customer needs. Additionally, AI solutions are designed with rigorous controls which are then systematically tested and monitored.

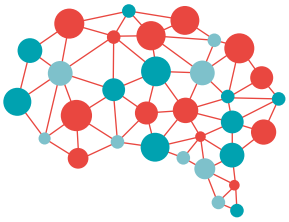
Market competition and anti-trust are two topics at the centre of the systemic risk debate. Some respondents predicted that a small number of powerful AI providers could emerge, as is the case in the cloud computing market. The risk of vendor lock-in – dependency on one provider – would be a source of concern about healthy competition in the market. It was, however, noted that the smaller number of cloud providers had created a more resilient system. According to some respondents, it is too early to make a prediction at this point as to how the market will evolve. Others noted that an increased proliferation of AI solutions would lead to greater diversification and divergence in the market. In the interim, solutions for concentration risk were put forward: Open Data, multi-cloud strategy and in-house AI solutions.

A significant research finding is that firms endorsed the statement made by the Financial Stability Board that "AI does not currently pose a systemic risk."[29] Many of the systemic risks discussed may be longer-term concerns given the current maturity of AI technologies. It is recommended that, in the short term, regulators continue to monitor developments within the financial market as opposed to marking direct regulatory intervention and factor this issue into periodic reviews of the stability of the market, for example as with the FCA's operational resilience discussion paper.[30]

Algorithmic trading in investment banking

Complex AI technologies are the basis for algorithmic trading which enables fast trading decisions. In the age of ultra-high-frequency trading, investment banks are turning to AI to improve their stock trading performance and boost profits. Investment banks have invested in systems that store vast amounts of price and trading data. By tapping into this reservoir of information, AI systems may predict how share prices will be trending a few minutes down the line, based on historical price and trading data. As AI systems gain more data and experience, they also enhance their price-prediction ability.

INDUSTRY RECOMMENDED BEST PRACTICE



Ecosystem resilience

Ensure there is strong traceability of data and algorithms for both in-house, customised, and standardised AI systems. This is to ensure that applications of AI and machine learning do not result in new and unexpected forms of interconnectedness between financial markets and institutions.

Develop business continuity and resilience plans in the event of a failure/threat. This will require the retention of greater human oversight of AI systems. Human oversight and control of AI systems would reduce the occurrence of new risks and avoid exacerbating risks which already exist within the financial system, and that could result in systemic threats.

29 Financial Stability Board, 'Artificial intelligence and machine learning in financial services: Market developments and financial stability implications.' (November 2017), available at: http://www.fsb.org/wp-content/uploads/P011117.pdf

30 Bank of England, the Prudential Regulation Authority and Financial Conduct Authority, 'Building the UK financial sector's operational resilience', (July 2018) available at https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/discussion-paper/2018/dp118.pdf?la=en&hash=4238F3B14D839EBE6BEFBD6B5E5634FB95197D8A

FOSTERING INNOVATION: A SUGGESTED APPROACH TO AI POLICY DEVELOPMENT FOR UK GOVERNMENT AND REGULATORS

The UK is a world leader in the progressive regulation of the financial and related professional services industry. The FCA Sandbox, the Innovation Hub and the Global Financial Innovation Network are notable examples of UK regulators actively encouraging and facilitating innovation. As part of the research project, we considered whether new, standalone, AI regulation would need to be devised and adopted in response to the set of four key themes discussed in the previous chapter.

A regulator's approach to emerging technology is the first step towards enabling greater public trust in AI, proving that proper safeguards are in place to mitigate against consumer harm. Trust is the prerequisite for success to help businesses to gain or regain consumer confidence. UK regulators can adopt a convener, standard-setting role in the field of AI regulation. Regulation is a journey and requires broader engagement with many different stakeholders including government, regulators, industry and public. Another key consideration is for regulation to be set in a global context and adapted to the local market.

As innovation outpaces regulation, policymakers face a host of unique challenges created by digital technologies and increasingly digital business models. One key challenge for regulating emerging technology, including AI, is how to balance consumer protection with innovation. Effective regulation protects consumers, enables fair competition, fosters public trust and ensures market stability. Conversely, premature regulatory action risks stifling innovation and driving away investment.

The research indicates that respondents broadly endorse the position taken by the UK House of Lords Select Committee on AI that "blanket AI-specific regulation, at this stage, would be inappropriate".[31] It was argued that, given the maturity of AI, intervening with direct regulation for AI is likely to stifle innovation in the industry. The industry leaders interviewed advised an approach to AI policy that involves leveraging existing regulatory frameworks. Moreover, feedback received from participating firms indicated that the UK's regulatory architecture remains robust and fit for purpose for addressing AI, and that there are no regulatory barriers to the use of AI in the UK-based financial and related professional services industry.

31 Hall, W. and Pesenti, J., 'Growing the Artificial Intelligence Industry in the UK.' (October 2017) available at: https://www.gov.uk/government/publications/growing-the-artificial-intelligence-industry-in-the-uk

FIGURE 9

AI regulatory mapping

		REGULATION									
		FCA	PRA	CDEI	ICO	CMA	SMCR	FSB	MIFID II	GDPR	PSD2/ Open Banking
FAIRNESS, TRANSPARENCY AND CUSTOMER PROTECTION	Automated decision making, profiling and bias			●	●			●		●	
	Transparency			●	●			●		●	
	Explainability			●	●			●		●	
DATA PRIVACY AND SECURITY	Data ethics			●	●						
	Data privacy									●	
	Data sharing									●	●
	Data security							●	●	●	
GOVERNANCE	Model risk management	●	●					●			
	Policies and procedures	●	●				●	●	●	●	
	Accountability, roles and responsibilities						●			●	
	Regular review and audit	●	●								
	Staffing and training	●									
ECOSYSTEM RESILIENCE	Third party dependencies					●		●			
	Market concentration							●			
	Market competition					●		●			
	Systemic risk							●			

● The topic explicitly covered by the report/article

● The topic will be covered in upcoming report/article

Source: Accenture analysis, 2019

International lessons can help inform the UK government's approach to AI. In January 2019, Singapore's Monetary Association launched a framework for 'Principles to Promote Fairness, Ethics, Accountability and Transparency' at Davos.[32] The framework was developed in collaboration with the industry, considering views and feedback from financial institutions, industry associations, FinTech firms, technology providers and academia. The industry can use this set of high-level principles as an industry benchmark and as a guide to inform their approach to ethical and responsible AI.

32 Monetary Authority of Singapore, 'Principles to Promote Fairness, Ethics, Accountability and Transparency (FEAT) in the Use of Artificial Intelligence and Data Analytics in Singapore's Financial Sector', (February 2019) available at: http://www.mas.gov.sg/~/media/MAS/News%20and%20Publications/Monographs%20and%20Information%20Papers/FEAT%20Principles%20Updated%207%20Feb%2019.pdf

A more prescriptive approach was taken by the European Commission. In April 2019, the European Commission released guidelines for Trustworthy AI.[33] The report proposes seven key requirements that AI systems should meet:

- human agency and oversight
- technical robustness and safety
- privacy and data governance
- transparency
- diversity, non-discrimination, and fairness
- environmental and societal well-being
- accountability.

Although these principles are not legally-binding, they could become the foundation for the EU's approach to new, standalone AI regulation.

In the 2019 white paper titled 'Regulation for the Fourth Industrial Revolution', BEIS stated the aim of reshaping the UK's regulatory approach so that "it supports and stimulates innovation that benefits citizens and the economy".[34] Policymakers signalled a shift towards 'anticipatory regulation' which adopts and promotes new regulatory approaches, methods and tools that allow innovation to thrive.[35] Anticipatory regulation is based on six principles: future-facing, proactive, iterative, outcomes-based, experimental, and inclusive and collaborative. This innovative approach to regulation has the potential to help bridge the technology policy gap and to support innovation.

The interviews made clear that leaders from across UK-based financial and related professional services want to see UK regulators playing a key role in encouraging the growth and adoption of AI in the industry.

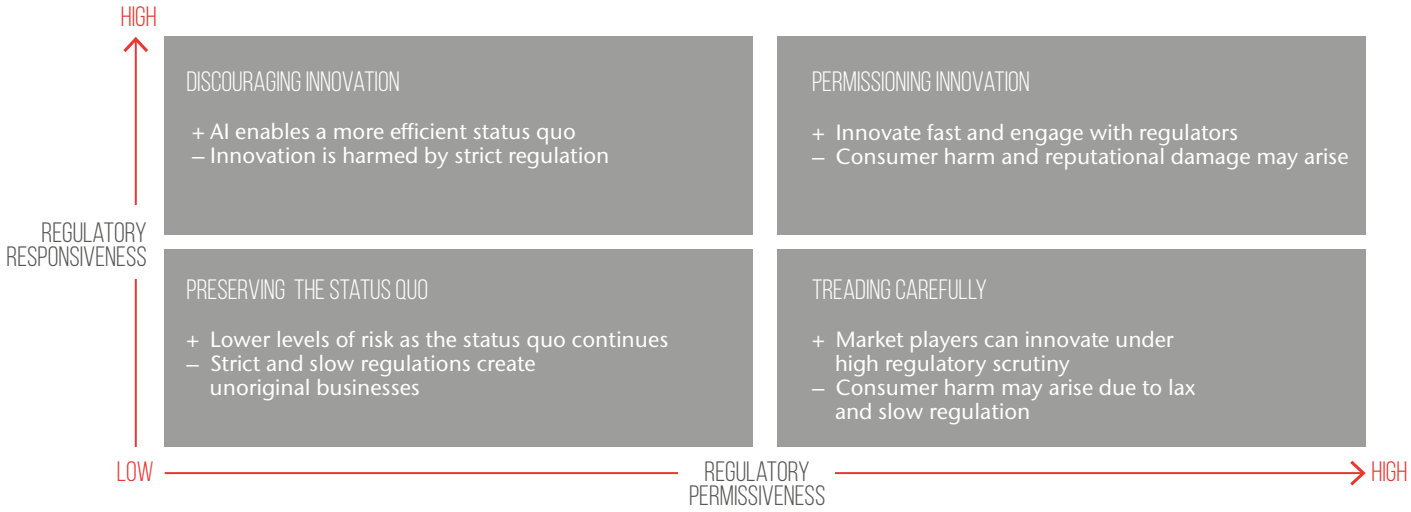
An innovation-friendly policy approach needs to balance regulatory responsiveness and permissiveness. Regulatory responses should reflect the rapid pace of technological advancement. Regulatory permissiveness should be set based on an agreed appetite for risk.

33 European Commission's High-Level Expert Group on Artificial Intelligence, 'Ethics Guidelines for Trustworthy AI', (April 2019) available at: https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai

34 UK Government, 'Regulation for the Fourth Industrial Revolution', (June 2019) available at: https://www.gov.uk/government/publications/regulation-for-the-fourth-industrial-revolution/regulation-for-the-fourth-industrial-revolution

35 Nesta, 'Renewing regulation: anticipatory regulation' in an age of disruption', (March 2019) available at: https://www.nesta.org.uk/report/renewing-regulation-anticipatory-regulation-in-an-age-of-disruption/

FIGURE 10
Regulatory approaches to innovation

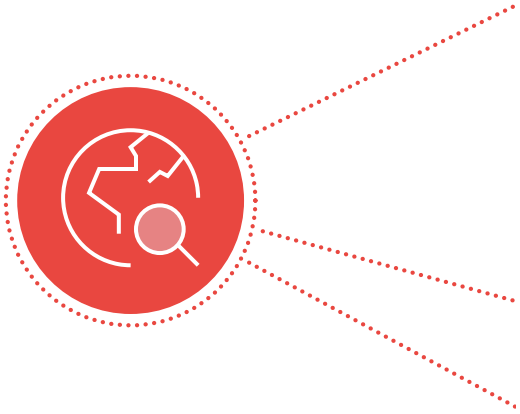


Source: Accenture analysis, 2019

Most respondents noted that it would be particularly useful for regulators to provide reassurance that their current set-up remains fit for purpose in an AI world, for example that their checks and controls are sound. Importantly, when issuing regulatory guidance, regulators need to communicate better that these are non-binding guidelines as opposed to binding regulation, to lessen industry's concern around stifling innovation. One respondent cautioned that strict regulation on AI may stifle innovation and make the industry less dynamic due to excessive reporting being requested by regulatory bodies.

Additional guidance from the regulator on when a technology becomes AI would be welcomed by industry. This advice could in many cases be informal, discretionary advice. For example, advice on what constitutes AI would help inform company policy on how to disclose to consumers that they are dealing with an AI-based system. In practice, AI-powered systems such as chatbots should be able to explain to consumers that they are dealing with AI. It was agreed that firms are not expecting, nor would they want, the regulator to approve specific technologies. Importantly, most respondents highlighted that despite the lack of AI specific regulation, they are forging ahead with their AI deployments. The current lack of AI-specific regulation may be due to the fact that AI-specific risks are yet to happen.

A key consideration for the future is whether the concept of innovation by default could be expanded and applied to AI pilots – and to production – given that there may be a host of potential risks arising when scaling AI. Another option is to apply the precautionary principle with regards to use cases that carry a high risk of consumer impact. Conversely, innovation by default could be applied to use cases that carry a low risk of consumer impact.



In the short term, regulating AI technologies requires the consistent application and enforcement of existing regulations, and executing based on current principles. From a legal and regulatory standpoint, using AI technologies does not pose significant new risks and issues, and current principles-led regulatory frameworks are fit for purpose. Most respondents advised against developing new AI-specific regulations for two reasons. Firstly, strict regulation would impede innovation by constraining 'the art of the possible'. Secondly, the current level of AI technology maturity means it is still too early to regulate effectively.

Instead, it was suggested that regulators increase focus on firms' management of operational risk. The real risk is how AI technology is being applied in practice as opposed to any potential risks within the technology itself. Importantly, third-party risk needs to be better understood. There needs to be clear guidance on accountability for black box AIs developed by third-parties.

Finally, a challenge raised by many respondents is the overcrowding in the AI policy space. Given that there are multiple regulatory and non-regulatory bodies and initiatives working on similar topics, it is difficult for companies to build their engagement approach. For example, regulatory scrutiny for financial institutions may come not only from ICO but also from FCA and, potentially in the future, the CDEI. This requires firms to devote substantial resources to regulatory compliance.

UK policymakers will play a key role in encouraging the growth and adoption of AI in the UK financial services sector by fostering an innovation-friendly environment. This includes treading a careful balance between supporting businesses to innovate responsibly using AI versus second guessing firms as they trial and deploy these emerging technologies across their business. The leveraging and application of existing, tried-and-tested regulatory frameworks supplemented by regulatory guidance, codes of practice and industry standards will enable AI to thrive.

To foster an innovation-friendly environment for AI, it is proposed that regulators adopt a suggested approach to policy development based on the following principles:

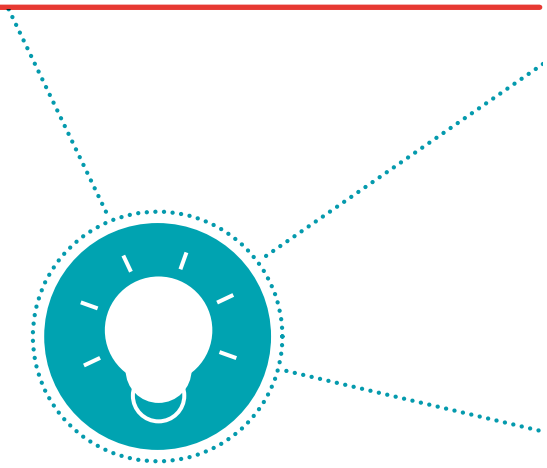
1. **Where possible, leverage and adapt existing regulatory solutions and frameworks.** For example, the SMCR remains a viable tool for making individuals accountable and can be applied to assign accountability for AI-driven outcomes.

2. **Where novel categories of risk emerge, ensure that targeted regulatory remedies are available to protect consumers, encourage healthy competition, and ensure market stability.** For example, customer redress channels and frameworks for customers seeking recourse for AI-derived outcomes would need to be built and promoted.

3. **Foster an innovation-friendly business ecosystem enabled by a principles-based, outcome-focused approach to regulation and avoid the imposition of prescriptive rules to allow for flexibility in application and for adaptability over time.** For example, close collaboration with the industry would be useful for defining a set of principles for transparency and explainability of the application of AI across various use cases in the financial and related professional services industry.

4. **Adopt a risk-adjusted approach to supervising AI deployment by taking into consideration aspects such as context specificity for AI use cases as well as impact assessments.** For example, regulatory guidance issued for firms would need to be tailored to account for sector, industry and AI use case.

CONCLUSION



AI is at the core of the ongoing technological disruption in the financial and related professional services industry. It has the potential to reshape the entire industry, creating the next generation of AI-powered financial institutions. This leads to new opportunities for value creation and poses meaningful challenges to be addressed. Promoting AI-driven innovation by means of a strategic partnership between government, regulators and the private sector will help grow and sustain the application of AI across the UK-based financial and related professional services industry. Firms and regulators will need to adopt a more collaborative approach: policymakers and industry leaders have an opportunity to work together to shape policy and industry initiatives to harness the potential that AI promises, and to address the risks and challenges that may arise.

While AI has the potential to help the UK-based financial and related professional services industry deliver significant shareholder and customer value, there are several challenges that require further regulatory attention and public debate. Despite these challenges, companies will need to significantly increase their investment in AI and is suggested regulators adopt an innovation-friendly approach. In the future, it will become essential to articulate frameworks and approaches that can both maximise the benefits and minimise the risks of AI.

Winning firms in the age of AI will adapt and update their business models. Their approach should be underpinned by a flexible, principles-based regulatory environment as the key enabler for harnessing the benefits of AI while minimising potential risks.

Policymakers' approach to emerging technology is also the first step in enabling public trust in AI, proving that proper safeguards are in place to mitigate against consumer harm. Trust is the prerequisite for success to help businesses gain or regain consumer confidence.

In the future, regulators may need to consider a framework for AI, but such intervention should be based around close collaboration between regulators, policymakers and the industry to create the right balance between innovation, growth, customer safeguards and market stability.

The AI imperative represents an opportunity for both industry and regulators to pave the way for future AI-enabled economic growth and societal benefit.

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