

A woman with dark hair and glasses is looking down at a tablet computer she is holding. She is wearing a light-colored blazer. The background is a server room with blue lighting and server racks. A yellow graphic element, a thick border, frames the text on the left side of the image.

How can regulation keep up as technological innovation races ahead?

The digital revolution brings new risks and old risks with new twists, challenging regulators and firms to adapt and adopt new strategies to keep markets and customers safe.



The better the question.
The better the answer.
The better the world works.



“Change has never happened this fast before, and it will never be this slow again.”

Graeme Wood, Australian digital entrepreneur, philanthropist and environmentalist

It’s “time to face the future.” That’s the headline message of the 2018 edition of EY’s Global Regulatory Outlook. As the final pieces of the post-crisis puzzle slide into place – including the conclusion of Basel III negotiations in December 2017 and the commencement of the EU’s MiFID 2 in January 2018 – the wave of reforms across key financial centers, devised in response to the financial crisis, and the resulting G20 agenda for post-crisis regulatory reform, has crested.

The story so far

Before we turn to the subject of regulation, though, we should review the state of the financial markets as this technological revolution gains momentum. Financial markets are changing rapidly. Technology companies have been at the forefront of this rush of innovation. Many such firms started out as providers of technology solutions to traditional banks. Operational platform providers offering, for example, products that record, monitor and report transactions continue to expand in parallel with increasing regulatory requirements.¹

Others, including well-known global digital platforms, have no previous track record in financial services but have already attained a dominant position in their respective markets. They have been quick to exploit corners of financial markets subject to lighter or phased regulatory burdens, such as payments facilitation and platforms that connect buyers and sellers of financial services such as loans and insurance. Their strategies have enabled them to build market share without immediately shouldering the same costly operational and regulatory burdens as full-service financial institutions.

Meanwhile, the launch of “open banking” initiatives in many jurisdictions has revealed a new landscape of opportunities. New rules mandating permissioned access to customer financial information held by banks to other service providers have opened up opportunities for all firms, particularly new market entrants. Application program interfaces (APIs) set standard access and security protocols that enable approved third parties to gather customer data made available by financial firms (with the customer’s consent). Somewhat controversially, financial firms providing data generally retain at least some of the privacy and security risks associated with how it is used but do not benefit from any reciprocal obligation for those third parties to share their own data.

Nonetheless, this innovation enables technology firms of all stripes to offer tailored services – including account aggregators, budget tools or investment platforms – directly to financial customers who are increasingly happy to share their data in return for customized products. These services will themselves generate even more data for service providers to monetize.

Against this backdrop, we see our clients using a range of new technologies, including artificial intelligence (AI), robotics, analytics and blockchain, to digitize their businesses, launch new ways of servicing their clients and deliver vital market services more efficiently. At their most successful, many of these new developments are delivering increased revenues, reduced costs for firms and better customer experiences. But now market participants and regulators alike are turning their attention to the other consequences of increasingly digitized markets.

¹ ASEAN FinTech Census 2018, EYGM Limited, 2018.

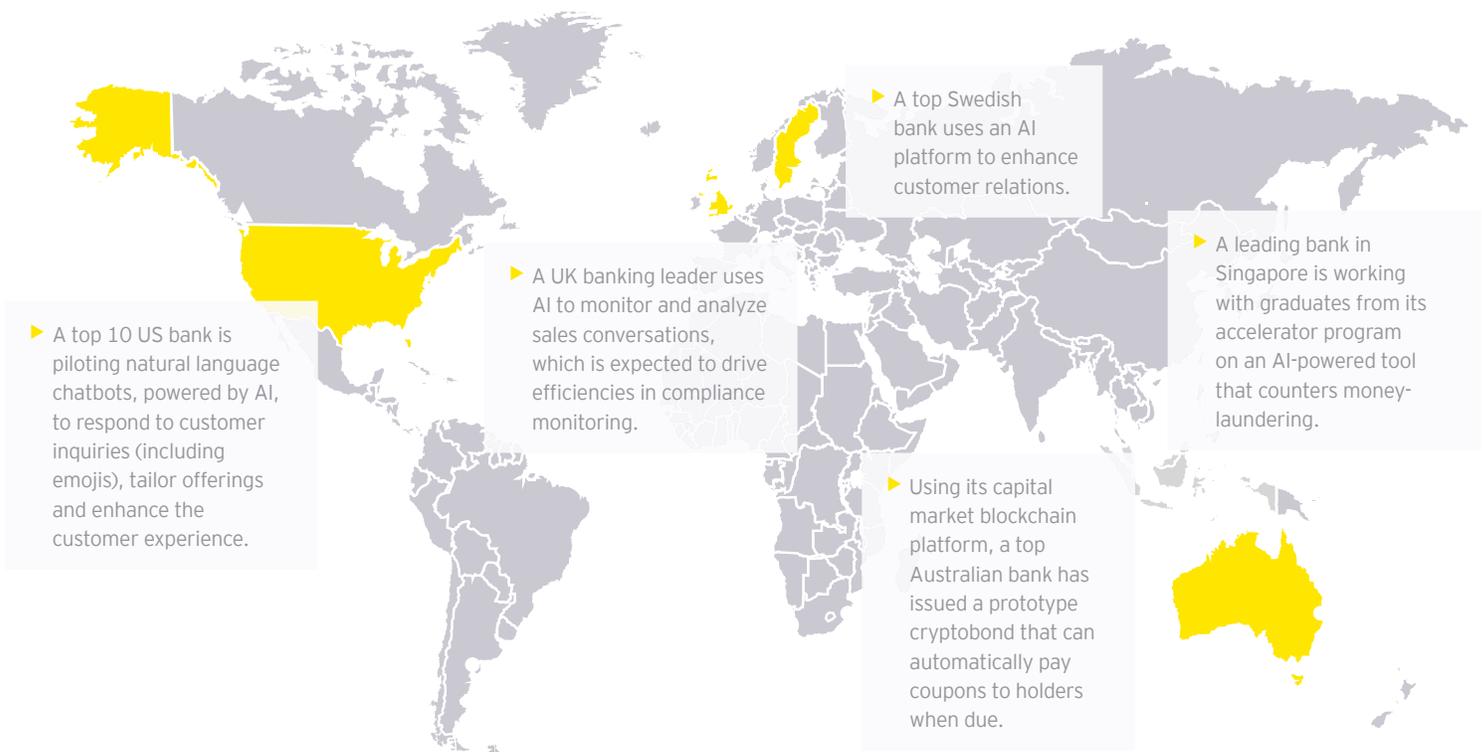
New risks, and new twists on old risks, inevitably follow from the introduction of new technologies, new market entrants and new ways of working. Systems can fail and undermine market stability, machines can make decisions with unintended consequences that harm customers and markets, and the almost-limitless data that is the lifeblood of the digital world can be manipulated, misused, stolen or, because of its sheer volume and complexity, even inadvertently used to disguise criminal behavior.

New players, including well-known platforms, have been quick to exploit the less-regulated corners of financial services, such as payments facilitation.

Despite these and other potential hazards, regulators and firms see significant opportunities to use the same technologies employed by financial firms to manage risks and enhance the efficiency, safety and soundness of markets. Global and local policy bodies are more aggressively addressing the need to harness and control the development, deployment and operation of new technologies. But the drive to build a more robust risk, regulatory and control framework to operate effectively in this digitizing landscape is exposing a number of practical issues and potential conflicts for all participants. Perhaps the greatest of these challenges is effective engagement among financial firms, nonfinancial new entrants, regulators and governments to devise solutions that work to the benefit of all.

The rise of regional innovation hubs

Banks around the world are working with FinTechs or internal teams to drive innovation, new products and enhanced services.



One of the biggest challenges of building a risk, regulatory and control framework in this digitizing landscape is successful engagement among financial institutions, nonfinancial new entrants, regulators and governments.

New technologies are already making an impact ...

There are many and varied examples of how the digitization of financial markets has enhanced and extended the end-user experience. API-powered online platforms – which allow multiple firms to interact and access and update data – have grown significantly and improved access for smaller firms and individuals that might otherwise have struggled for attention. Algorithms fronted by bots that use natural language processing (NLP) to understand written or spoken customer queries now deliver financial advice based on pre-programmed investment strategies and responses to standardized questions posed to potential investors. Proponents argue that these technologies can increase access to financial services and advice, as well as, some say, its consistency.

Complex algorithms have also transformed the speed and volume of trading in capital markets. Investors use algorithms to make decisions about when and where to trade and, in some cases, what and how much to trade, too. Bare-bones early models are giving way to algorithms augmented with advanced AI capability such as evolving “brain-like” neural network technology. Such enhancements enable the algorithms to adapt and improve their decisions as they absorb increasing amounts of data about the outcomes of trades.

The addition of NLP enables the machines to “read” news and other digital information sources to further evolve strategies and initiate trades in response. The Bank for International Settlements estimated in its 2016 report, “Electronic Trading in Fixed Income Markets,”² that up to 85% of trading in key asset classes such as equities and futures was initiated, in whole or in part, by computers. There is, however, no consensus around the question of whether these systems enhance or weaken financial stability.

Finally, distributed ledger technologies (DLT), often referred to as blockchain, are underpinning new methods of record-keeping and transacting and even new mediums of exchange. Cryptocurrencies have led the charge, with proponents touting them as a secure, anonymous store of value. Supporting them is a burgeoning array of exchanges and providers of “wallet” technology to record and transact in these new instruments. Although cryptocurrencies have attracted the most publicity (and caused considerable controversy), other DLT applications hold the promise to achieve less-controversial goals, such as creating more secure ways to record identities, transactions and changes of ownership. Commonwealth Bank of Australia, for example, has recently launched a prototype “blockchain bond” featuring embedded issuance and payment agency functions such as recording ownership and initiating (via a “smart contract”) payment of interest to the owner of record as of the coupon date.

² “Electronic Trading in Fixed Income Markets,” Bank for International Settlements, 2016.

Tapping the new tools to strengthen risk management and compliance

While the rapid pace of industry innovation continues and even intensifies, traditional firms and regulators are just beginning to use and explore how new tech can deliver risk management and regulatory compliance more efficiently and effectively. Firms have started to consider how best to deploy AI tools to enhance existing control processes.

Some are using machine learning to administer and improve traditional control testing activities. Others are employing AI to enhance the scope and effectiveness of monitoring and surveillance tools that seek out fraud, market abuse and money laundering. Still others are experimenting with machine learning and NLP to power internal “bots” that monitor customer calls and identify potential breaches of policy. Management is looking for ways to extend the scope of these efforts and discover new opportunities to lower compliance and control costs while improving regulatory performance. But cost, the difficulty of working around cumbersome legacy systems and, in particular, uncertainty over how regulators will respond to “teething troubles” in this experimental landscape are all limiting investment.

Regulators are learning from their own and the industry’s early forays into new technology. Many efforts are intended to help speed up and improve the experience of new entrants to the market. A growing number of regulators are operating regulatory “sandboxes,” innovation labs or innovation hubs to test out new, technology-led services. These facilities enable firms to test services in a safe environment and identify potential risks well before they seek authorization for themselves or their products.

Regulators are learning from early forays into new technology, with many efforts intended to speed up and improve the experience of new entrants to the market.



In other cases, governments and regulators are exploring centralized digital records of individual and company identities, which allow firms to treat the identity of registered, potential new clients as already initially recognized by a “trusted source.” Such records depositories can eliminate thousands of hours of repetitive due diligence. The Monetary Authority of Singapore (MAS) is also working closely with local and foreign banks to establish a Know Your Customer (KYC) Shared-Services Utility with the intent to streamline end-to-end KYC. The Utility, which Singapore hopes to launch later this year, will access trusted identity sources, including Singapore’s “MyInfo” digital ID, to verify customer identification and verification. It will also centralize key KYC activities including collecting and validating KYC documents, along with screening against sanctions and blacklists.

Others are increasingly looking at opportunities to employ technology to support their own policy and supervision efforts. Some are using machine learning, for example, to enhance surveillance of market activity and check the validity and accuracy of reports and models that firms submit to them. Others, such as the UK’s Financial Conduct Authority (FCA) and the MAS, are thinking further ahead to opportunities to fundamentally rewire how some regulations are communicated and fulfilled by digitizing and automating the process. The FCA, for example, has recently conducted proof-of-concept tests to explore fully automated regulatory reporting. In these tests, machines both published and directly interrogated and collected firms’ data, which could ultimately reduce intermediate processing and enhance the consistency of reporting obligations and returns.

Regulatory and policymaking bodies, including the Financial Stability Board (FSB)³ and the MAS⁴ in Singapore, are exploring the possibilities of supervisors scaling up capabilities in AI and NLP. These technologies could help supervisors monitor political, economic and market activity; spot signs of trouble ahead; and, perhaps most important, match the speed and pervasiveness of computer-generated trading and transactions.

Finally, regulators are analyzing new products such as cryptocurrencies to determine what purpose they serve, how they are marketed and to whom, and how they perform over time. Regulators can then determine whether to apply regulations analogous to those governing similar activities and products, where possible, or define a new class of asset or service where not.

Effective risk management necessitates a fundamental reassessment of how all market participants contribute to a more transparent, balanced and connected ecosystem.

³“Regulatory and Supervisory issues with Fintech,” FSB, 2017.

⁴“New \$27 million grant to promote Artificial Intelligence and Data Analytics in Financial Sector,” MAS, 2017.

But when it comes to using new tech to control new tech, it's early days yet ...

For all the progress that firm management and market supervisors have made, they are still groping their way forward as they attempt to identify and describe the risks posed by new technologies and new ways of doing business. Attaining clarity and establishing accountability over how the “machines” (which are, in fact, complexes of hardware and software) are designed and built and how they operate are proving difficult. So is anticipating what could go wrong. This challenge grows more acute as the pervasiveness, complexity and intelligence of machines accelerate.

At the same time, confidence in the effectiveness of traditional controls has eroded in the face of massive increases in the volume of data and the speed of processing, which can only be matched with digital tools. Market stakeholders each have their own views of how much protection should be in place over the data flowing into and out of these digitized markets, how that protection should function, and who should provide it. Regulators and supervisors are exploring these issues and asking many questions, but finding the answers (and the funding) to satisfy them is most often the obligation of the management of traditional financial firms.

These efforts are all steps in the right direction. In our view, however, effective risk management in a rapidly digitizing landscape necessitates a more fundamental reassessment of how all market participants should contribute to deliver a more transparent, balanced and connected risk management ecosystem. Firms, investors, regulators and their advisors need to revisit old principles, ask new questions and collaborate much more than before to deliver answers that meet future needs rather than patch the past. Below are some of the

overarching considerations that we think should guide these efforts. Over the coming months, we will share our thinking on these and other questions that need to be asked, as well as some of the options we see to move the dialogue forward.

Shared compliance effort

Scale, consistency and investment in leading practices and common standards are the keys to reaping maximum benefit from technology in financial markets. Creating these conditions encourages improvements in how machines learn, leverages their speed and capability, and supports genuinely market-wide services as well as risk management. But most financial firms are constrained by scarce resources, limited reach, high investment requirements and fragmented processes. Collaborative effort could help address the issues impeding more widespread adoption in critical compliance and market monitoring activities.

Standardizing to accelerate path to more effective digital compliance

Machines operate on rules, and algorithms improve as data inputs accumulate. But firms and regulators employ inconsistent and unclear definitions and standards for rules and requirements, along with the fragmented data and processes used to meet them. The siloed information and activity that results limit opportunities to deploy new technology where it could be most effective: in providing market-wide services and solutions. Roadblocks to date slowed progress toward data standardization, but combined industry and regulatory effort may drive a solution.



Rethinking accountability and transparency to share the load

Senior bankers have been left in no doubt that they will be held accountable for their organizations' failings, large and small. But that accountability is approaching its practical limits. Regulators often hold bank executives accountable for every aspect of the business, including outsourced services and data that third parties access and reuse. Machines are also influencing ever more day-to-day decisions, even as the logic the machines use to reach these decisions grows ever more opaque as technology advances. We will revisit current approaches to accountability and consider some of the specific challenges and possible responses to help management meet their obligations.

Reassessing risk management to accelerate progress

New technologies are generating both new risks and new ways in which old risks can arise. The practice of risk management was built around quantifiable risks such as market, credit and liquidity. And while the misconduct scandals of the past decade have drawn attention to less-quantifiable types of risk,

risk-management frameworks at many firms are often still fragmented, backward-looking and focused on discrete details rather than the big picture. Traditional risk-management principles need reimagining to address a world in which risks can manifest themselves in milliseconds and multiply exponentially, sometimes outside the control of any single person, firm or function.

Governing, not just mining, data

The use and management of data will make or break the financial markets of the future. The growing volume of data poses opportunity and risk in equal measure. Customers see the benefits of faster, customized services that open access to data can enable. But it's increasingly clear that advancing technology can create opportunities to abuse that access, especially as cloud solutions add complexity and new dynamic to the data ecosystem. Only technology-led solutions to monitor, analyze and protect data can match the scale and magnitude of these risks and enable their management. In future publications, we will look at some of the specific issues and approaches that could improve existing data governance frameworks.



Summing up

Technological advances offer opportunities to massively improve the efficiency and outcomes of financial markets. Technology's rapid rise and the increases accompanying scale and complexity also create new challenges for meeting regulation's unchanging objectives: managing market instability and avoiding harm to customers and counterparties. As market participants and supervisors explore the use of technological advances, we expect regulators – together with other market participants – to ask new questions of old methods to build a more agile and digitally enabled regulatory foundation for the future.

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EY Global Regulatory Network executive team previous appointments

Kara Cauter

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She has over 20 years' experience working in global professional services firms, advising banking clients on the implications of the regulatory agenda and designing approaches to effectively meet those obligations.

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FROB (Spanish Banking Resolution Authority) Head of International Coordination and EBA and FSB representative; Spanish Ministry of Economy: Director of Office of the Secretary of State for the Economy in the Economic Affairs; Head of the Spanish Delegation in the Paris Club; Deputy Head of relations with the IMF.

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Autorité de Contrôle Prudentiel (French Prudential Supervisory Authority); Association Française des Banques (French Banking Association); and French National Institute for Statistics and Economic Studies. She has also held senior roles at a global investment bank.

Eugène Goyne

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He has over 20 years in government and senior regulatory roles. He was previously deputy head of enforcement at the Hong Kong Securities and Futures Commission (SFC). Prior to the SFC, Eugène worked at the Australian Securities and Investments Commission and the Australian Attorney General's Department.

Kentaro Kobayashi

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He spent 37 years as a financial regulator. He held positions in the National Tax Agency and later, Ministry of Finance (MOF), Japan's former financial regulator. After the establishment of the Financial Supervisory Agency (FSA) of Japan in 1998, he served as Chief Inspector and Inspection Administrator and continued to serve in this role after the FSA was reorganized into the Japan Financial Services Agency in 2000.

Christian Lajoie

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As former head of Group Prudential Affairs, BNP Paribas, Christian has broad banking experience and a deep understanding of the regulatory and supervisory impacts on bank management and strategy. In recent years, he played an active role in regulation-making, participating in many international forums and also served as Vice Chair of the EBA Stakeholder Group.

EY Global Regulatory Network executive team previous appointments (continued)

John Liver

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Divisional Compliance Lead at Barclays; Head of Department, Investment Firm Supervision and prior roles in enforcement and supervision of investment management, life insurance and pensions at the UK Financial Services Authority and its' predecessors. He is currently EY/UK Financial Conduct Authority relationship lead.

Shane O'Neill

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He has 20 years experience in banking, capital markets, asset finance and prudential regulation in a variety of CFO, COO, strategy and planning, and regulatory roles. Following the financial crisis, Shane was Head of Banking Supervision at a Eurozone Central Bank for four years, during which he influenced significant restructuring, recapitalization and change in the banking sector and in credit institutions, and executed numerous stress tests and asset quality reviews.

Keith Pogson

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Immediate past President of the Hong Kong Institute of Certified Public Accountants; more than 20 years of experience advising governments and regulators across Asia-Pacific on acquisitions, market entry strategy and due diligence across banking, asset management and securities.

Marc Saidenberg

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Senior Vice President and Director of Supervisory Policy at Federal Reserve Bank of New York; Basel Committee Member and Liquidity Working Group Co-chair; involved in the development of supervisory expectations for capital planning, liquidity risk management and resolution planning.

Scott Waterhouse

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He was capital markets lead expert for large banks at the Office of the Comptroller of the Currency (OCC) and Examiner-in-Charge of the OCC's London Office. He coordinated the supervision of trading, treasury and capital markets activities including Dodd-Frank implementation and Basel Committee requirements.

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About the EY Global Regulatory Network

Our Global Regulatory Network helps clients find solutions to their regulatory challenges, providing extensive experience, leadership and strategic insights on financial regulation. The network helps our clients to understand and adapt to the impact of the changing regulatory landscape.

Led by John Liver and Marc Saidenberg, the network comprises more than 100 former regulators throughout the Americas, Asia and Europe, many with senior regulatory experience, including membership in the Basel Committee, the Financial Stability Board, the European Banking Authority, the Federal Reserve Bank of New York and the Japanese Financial Services Agency. The network helps our clients to understand and adapt to the impact of the changing regulatory landscape, advising on such topics as:

- ▶ Capital and liquidity
- ▶ Recovery and resolution
- ▶ Governance
- ▶ Risk culture and controls
- ▶ Structure
- ▶ Conduct

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