



In Collaboration With



REGTECH FOR REGULATORS

RE-ARCHITECT THE SYSTEM FOR BETTER REGULATION

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WORLD GOVERNMENT SUMMIT



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The Summit is a gateway to the future as it functions as the stage for analysis of future trends, concerns, and opportunities facing humanity. It is also an arena to showcase innovations, best practice, and smart solutions to inspire creativity to tackle these future challenges.

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INTRODUCTION

Regulators are increasingly being challenged to ensure the desired social, economic and environmental outcomes while reducing the costs on businesses and citizens. Jobs, investment, pollution, security—citizens expect effective solutions to multiple problems. Delivering on these expectations is not easy.

The UK government, for example, has set the target of £10 billion reduction in the cost to businesses between 2015 and 2020. By June 2016, it had managed to achieve less than £885 million in savings for businesses, due almost entirely to a single initiative—a 5p charge by large retailers for single-use plastic bags.¹

Added to the mix of challenges now is the digital revolution, which requires faster response from regulatory authorities. Traditional regulatory interventions may no longer be suitable for the digital era. Digital businesses, such as Uber and AirBnB, and innovative services and products, including FinTech and Initial Coin Offering, are either challenging or bypassing regulatory processes.

To keep pace, regulators across the developed and developing world are busy identifying the opportunities and challenges presented by rapidly evolving technologies. The Securities



and Exchange Board of India, for example, recently constituted a committee to assess the impact of FinTech and RegTech on the Indian security market and the regulatory response to these emerging trends, especially the adoption of technology solutions for its regulatory functions.²

RegTech opens a treasure chest of opportunities for regulators to use analytics and anticipatory interventions at an unprecedented scale. However, it also pushes them to build trust in regulations needed for new business innovations and efficiencies. In the words of Prof. Joyce O'Connor,

Chair, Digital Future Group, the Institute of International and European Affairs: “The key drivers of adoption of RegTech by regulators are the desire for increased trust and security in digital services, and the opportunities that flow from this, particularly in terms of new business opportunities and increased efficiencies. Being able to provide certainty is another factor, of which the European Union’s abolition of roaming charges is a good example.”³

This paper aims to provide insights into how regulators can use emerging technologies—especially RegTech—to enable a more efficient and effective regulatory environment. In this paper, RegTech is defined as the innovative application of emerging technologies by organizations to adapt to changing compliance requirements more effectively and efficiently, mitigate risks due to non-compliance and gain competitive advantage. The potential benefits for regulators include bringing in systemic changes to redesign regulatory processes, enabling real-time data-driven decisions that will ensure mission effectiveness and promoting innovation.

As regulators attempt to reduce the cost of compliance and become catalysts for innovation and business growth, they are increasingly looking at digitally transforming their operations. For example, the Australian Securities and Investments Commissions set up an innovation hub in 2015, while the UK Budget mandated regulators to support RegTech. The challenge for regulators is to figure out the steps that they need to take to implement these digital solutions.

The questions this paper seeks to explore include:

- Why is the digital transformational journey important for regulators?
- What does the roadmap for RegTech adoption look like?
- How can regulators truly transform themselves and the business ecosystem using regulation as a platform?
- How can regulators evaluate their performance, while addressing the risks?

Traditionally, regulators have taken two approaches to reform the regulatory process: a principles-based approach versus a rules-based one. Principles-based regulation—as opposed to a “tick-in-the-box”, rules-based system—keeps the focus on the intent of regulation and offers flexibility to businesses. However, this introduces uncertainties and enforcement challenges. Regulators can now focus on an insight-driven approach based on RegTech solutions. Managing this transition requires a data-driven approach, with scalable solutions and partnership with the regulated.

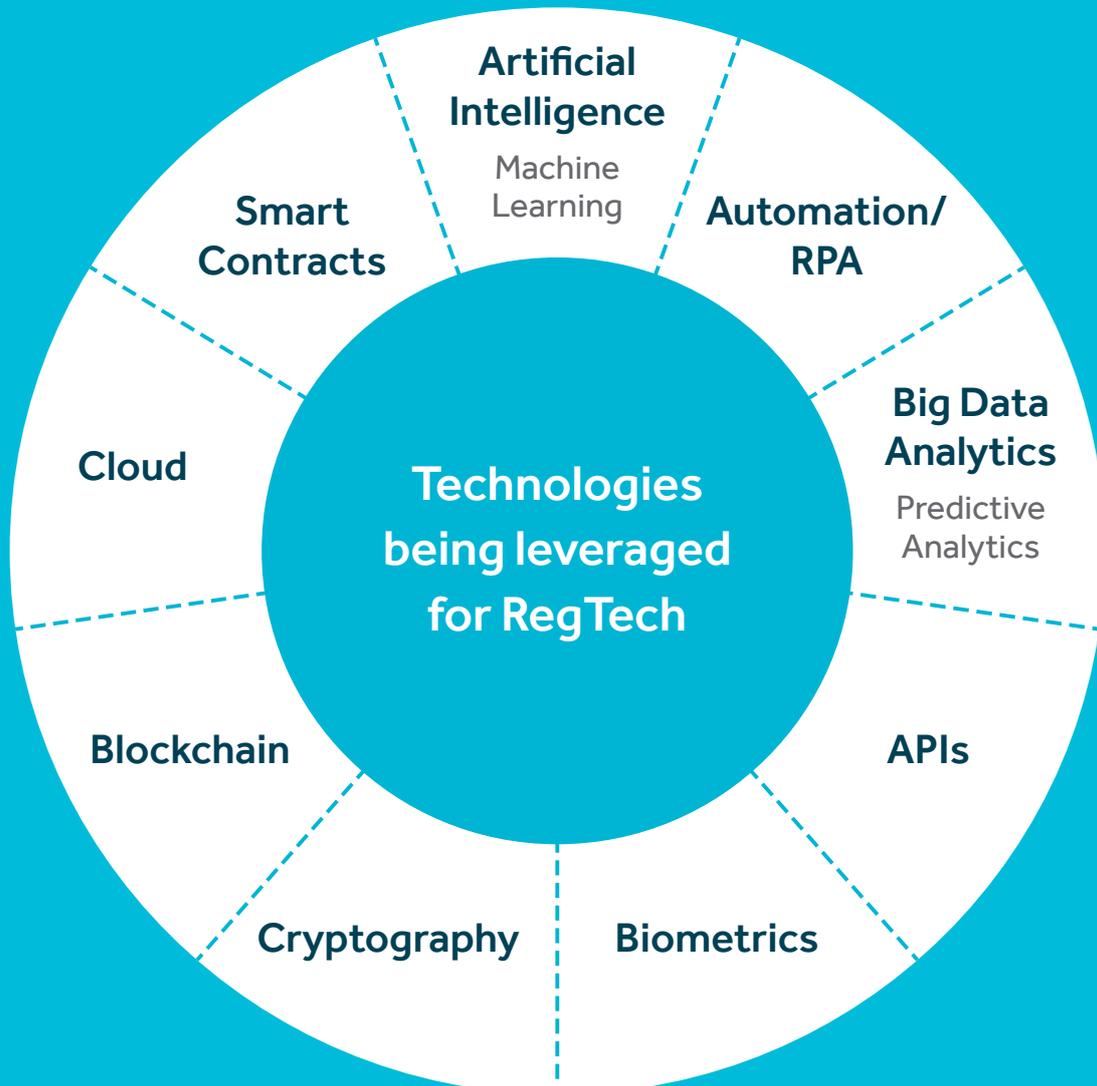
Innovative applications of emerging technologies—including AI, Automation, BigData, Cloud, Smart contracts, Blockchain—have the potential to offer new and advanced solutions to regulators (Figure 1). These may include Robo handbooks that allow machine-readable access to regulation helping reduce the cost of regulatory change, AI for real-time compliance monitoring of trades and transactions, and utilization of Blockchain for increased transparency in fund utilization.

The combinatorial power of these technologies has the potential to completely transform regulatory compliance.

Truly delivering on this promise will, however, require collective buy-in from all stakeholders (the regulator, the regulated and the protected). Further, converting large amounts of data into knowledge and insight will require a data-centric approach—harmonizing data across jurisdictions and institutions, creating an integrated data taxonomy, breaking data silos created by legal and regulatory requirements, and standardizing data and data sharing vehicles.

The study combines primary and secondary research methods to understand the potential of RegTech to transform regulators. Insights from interviews with industry experts and analysts have been used to supplement Accenture’s proprietary knowledge and research on the topic. The case studies in the paper focus primarily on financial services, which is a sector leading in the adoption of RegTech. However, the applications are equally relevant for other sectors of the economy (see Appendix 1).

Figure 1 – Innovative technologies being leveraged by RegTech players



WHY REGTECH: MOVING BEYOND COMPLIANCE TO FOCUS ON INNOVATION

It is well understood that the regulatory environment has a direct bearing on the capacity of an industry or an economy to innovate and grow.

A World Bank study of business regulations in 135 countries found that those with “better regulations grow faster”.

Improving from the worst to the best quartile of the World Bank Doing Business indicators leads to a 2.3 percent increase in a country’s average annual growth.⁴ Examining the link between business regulatory reform and economic growth across 172 countries, Jamal Ibrahim Haidar at the Paris School of Economics estimated that a business regulatory reform, on an average, increases the rate of growth of GDP by nearly 0.15 percent.⁵

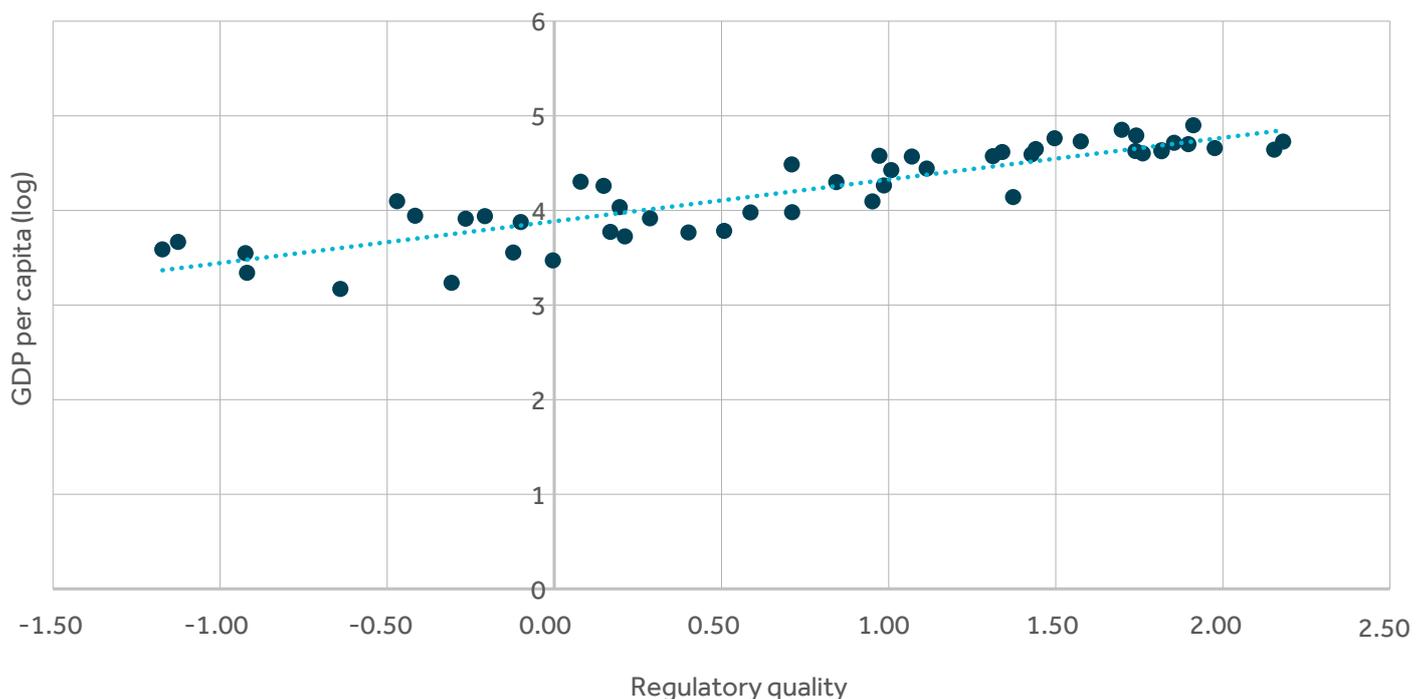
There is a clear positive correlation between perception of regulatory quality and GDP per capita for top 50 economies accounting for nearly 92% of the global GDP (Figure 2).⁶ Regulatory quality as measured by the Worldwide Governance Indicators (WGI) project, “reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development”.⁷

Not only does the quality of regulation have a bearing on economic growth and development, but it can also spur companies to innovate. The Porter Hypothesis proposes that “stringent but properly designed environmental regulations can trigger innovation that may partially or more than

fully offset the costs of complying with them”.⁸ Regulation can move organizations to develop new products and services.

On the flip side, the absence of a supportive regulatory environment limits an economy’s ability to attract investments and grow. There is growing evidence that companies struggle to keep pace with the changing regulatory landscape and continue to face punitive action. They are now looking at more innovative ways to reduce compliance costs, especially the use of technology.⁹ While principle-based regulations ensure a focus on outcomes and are preferred by chief executives as they offer flexibility to innovate, compliance officers struggle to define what they mean in terms of processes and systems to enforce compliance.

Figure 2 – Strong positive correlation between regulatory quality and GDP per capita (2016)



Source: Accenture Research, World Bank, Worldwide Governance Indicators

Ultimately, outcomes need to read the same and get codified in terms of practices and rules to promote clarity. As regulators look to become catalysts for innovation and business growth and introduce more effective and efficient regulatory systems, they need to consider a shift from the traditional debate between risk-based and principles-based regulation towards a system that is data and insight driven (Figure 3).

This shift towards an insight driven model of regulation requires digital transformation of regulators using RegTech. Leading regulatory agencies are evaluating the use of new technologies to not only respond to the digital transformation of market participants but also to better respond to internal operational challenges. Even though these are still early days, the potential benefits are becoming clear, which include external benefits to the economy and the regulated entities, as well as internal benefits to the regulators.

Figure 3 – How the regulatory structure is evolving

RULES-BASED	PRINCIPLES-BASED	INSIGHT-BASED
<ul style="list-style-type: none"> • Set of detailed rules • Tick-in-the-box • Clarity and certainty • Transparency • High compliance costs • Innovation depressed • Excessive litigation 	<ul style="list-style-type: none"> • Standards for desired outcomes: Consequences matter • Dialogue with regulators • Scalability with business • Flexibility and freedom • Enforcement and implementation challenges • Uncertainty and unpredictability 	<ul style="list-style-type: none"> • Increasingly data-driven reducing friction between policymakers and enforcers • Focus on real-time insights and forecasts • Businesses require internal risk assessment and control mechanisms • Shift from Know Your Customer to Know Your Data • Assurance of compliance (from sample-based to universal evaluation) • Increased experimentation in controlled environments

INTERNAL BENEFITS TO REGULATORS

1. Build preventive compliance systems:

Traditionally, regulators have looked at ex-post audits and analysis to prevent future misconduct and contain systemic risks. In contrast, compliance can be built into the system using RegTech. For example, with smart contracts, regulatory breach is impossible by design and default.¹⁰ The contracts are encoded into the system and executed without middlemen using a distributed ledger to exchange products, services and money in a transparent and irreversible manner.

2. Monitor everything in real time:

Real-time information sharing can help make better decisions. The Financial Conduct Authority (FCA) in the UK, in 2014, took on the responsibility of supervision of consumer lending, which included payday loans that are short term loans often provided at very high interest rates. To protect consumers from spiraling debt and default, the FCA not only capped the interest rate and overall cost of borrowing, but it also strongly encouraged firms and credit reference agencies to share data in real time to assess affordability and eligibility under FCA's responsible lending rules.¹¹ Capturing real time data from lenders can enable regulators to intervene quickly and protect customers from exploitation.

3. Improve supervision using the wealth of data and information:

Regulators have traditionally been good at using structured data, but not so much with unstructured information, which it is now possible to analyse using technology based approaches. Not only are there multiple public and open data sources available, regulators can move towards review of the data of an entire population as opposed to assurance based on a sample driven analysis of risks. Using AI and advance analytics, they can develop better predictive models of harm to intervene and influence market abuse and misconduct. The use of supervisory technology has the potential to drive positive outcomes in the wider economy. For example, the National Bank of Rwanda (NBR) uses an electronic data warehouse system to automate and streamline reporting processes that facilitate market supervision. The NBR now has access to data on the adoption levels of different financial products and uses that insight to adapt its supervisory processes to improve financial inclusion in the country.¹²

4. Narrow the gap between intent and implementation:

The move towards Regulation as a Platform being led by the Commonwealth Scientific and Industrial Research Organization in Australia with its Digital Legislation initiative is a bold step in this direction.¹³ Technology also offers the option to change reporting requirements to reduce implementation costs for businesses and influence better monitoring of behavior. The use of cybernetics for developing self-regulating systems can help mitigate externalities, address information asymmetry, and control efforts by interest groups to redistribute wealth in their favor. One such example is the acquisition of Sybernetix, a London-based RegTech company, by NASDAQ to learn individual and group behavioral fingerprint of traders and detect any unusual trading activity based on time, people, email traffic, place of trade etc.¹⁴ This can help detect deviations from the norm and identify any rogue or insider activities. Combining behavioral analytics with machine intelligence and cognitive computing offers a wealth of opportunities to regulators.

5. Increase internal process efficiency:

Technology offers opportunities for regulators to be better and more efficient at what they do. By automating workflows, regulators are able to reduce the cost and complexity of regulatory reporting and compliance for itself as well as regulated organizations.

EXTERNAL BENEFITS TO REGULATORS

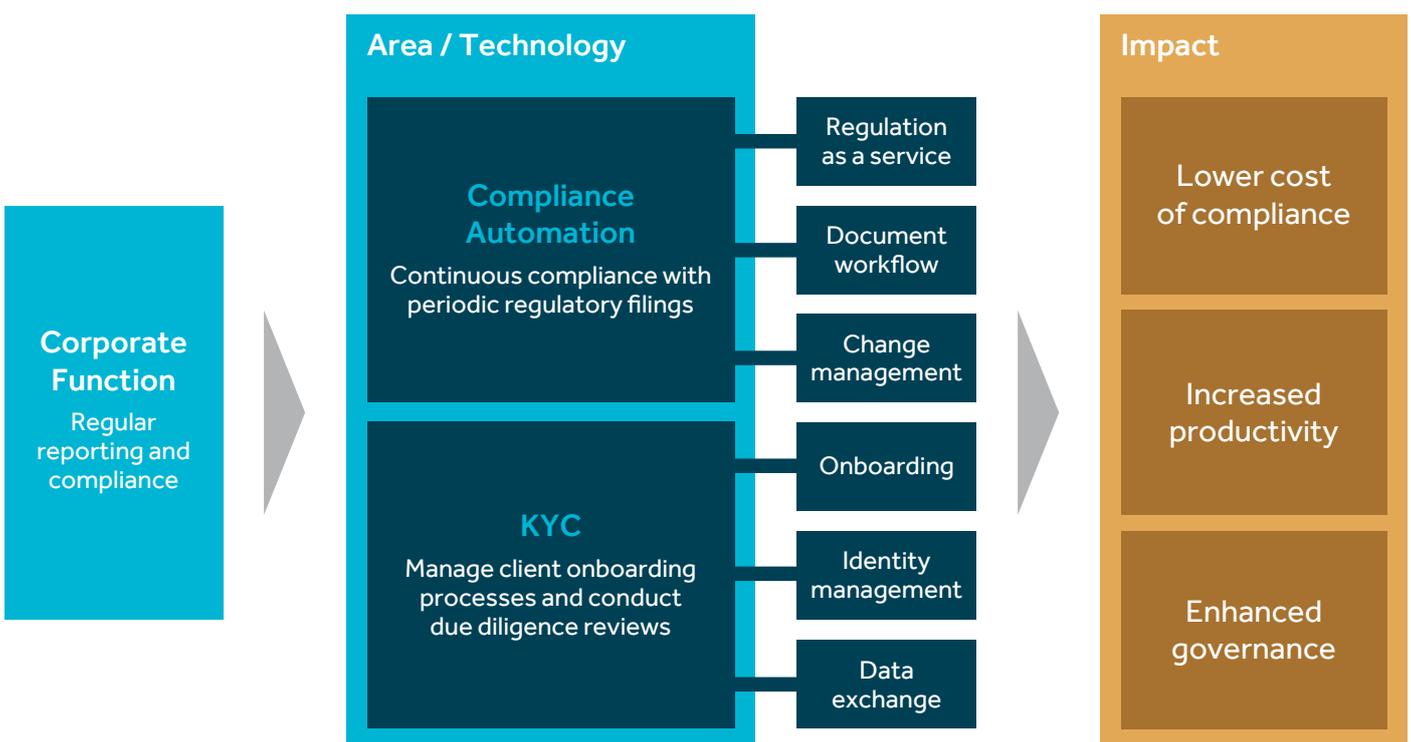
1. Ensure effective competition:

Take the case of Dubai Financial Services Authority (DFSA), which regulates the Dubai International Financial Centre (DIFC) set up as a free zone with a predictable law environment using the English common law for financial firms. DIFC has nearly 460 financial services firms that come from around the globe. DFSA maintains regular contact with the RegTech firms in DIFC but does not regulate them. Instead, it explores the possibility of using these technologies to regulate the financial services firms present in DIFC, including the possibility of using analytics engines for analyzing data to predict the likely future behavior of firms and identify positive behavior that can help firms develop.¹⁵

2. Reduce compliance expenditure and complexity:

There are many reasons why compliance expenditure of businesses has shot up. This includes the struggle to keep pace with the rapidly changing regulatory landscape as well as identification and filling of gaps in regulatory compliance since the financial crisis. Not meeting regulatory requirements has resulted in massive fines for corporates. RegTech offers the option for businesses to lower the cost of compliance through automation. Many RegTech firms already offer such services, such as automation of document workflow, onboarding of customers, identity management etc. (see Figure 4).

Figure 4 – Applying RegTech in the compliance function to reduce cost



3. Increase innovation and competitiveness of businesses:

Modelling and visualization techniques allow simulations to understand the impact of regulation on new products and services. Scenario analysis and stress testing can reduce the time to market and the barriers to entry. Further, enhanced risk management is possible through inbuilt compliance mechanisms that automate regulation interpretation and create self-adapting systems.

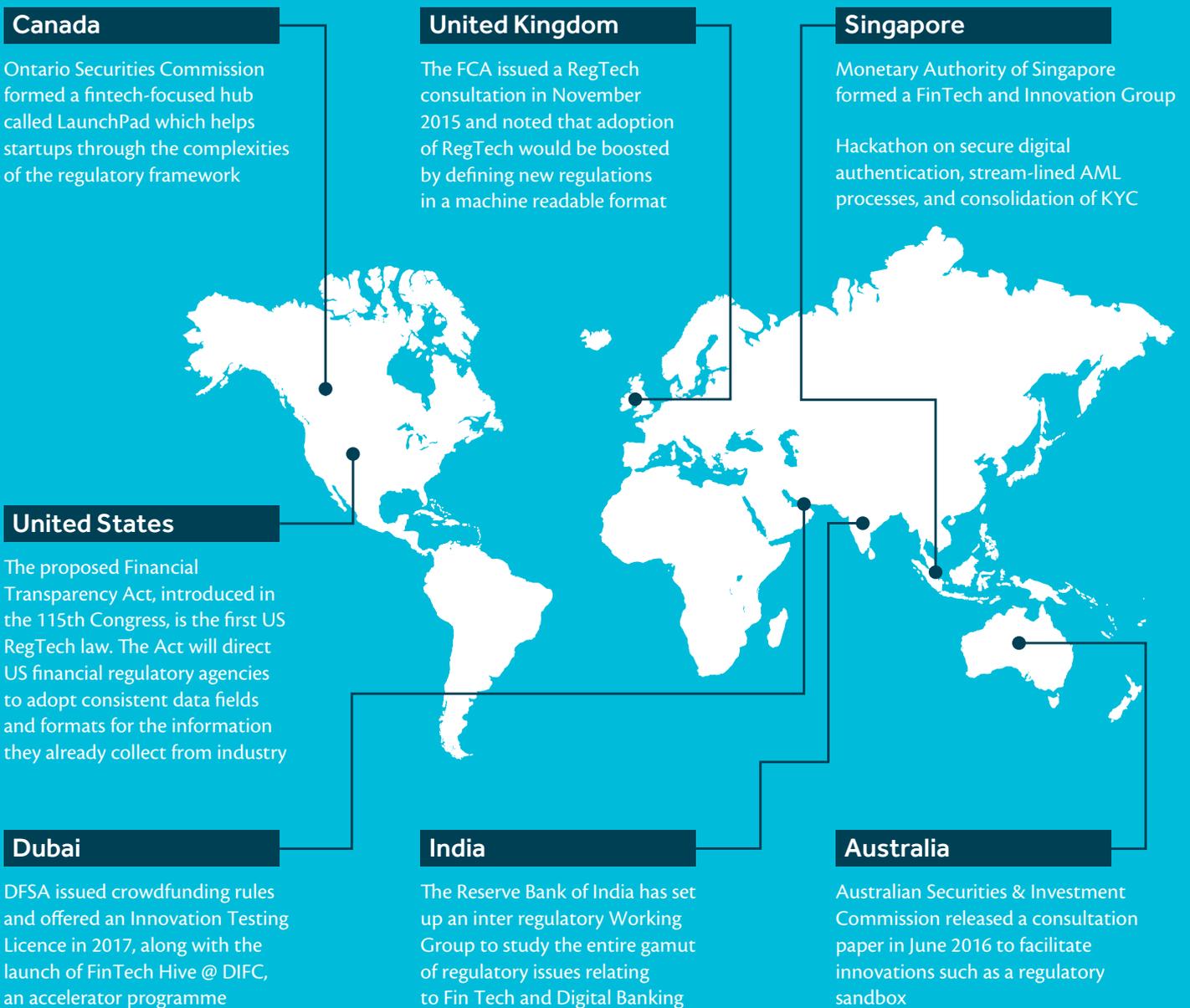
As the nature of business changes with digital technologies and platforms, new risks emerge. To enhance customer protection and market stability, regulators are opting for technology innovations that enable a fuller review and real-time monitoring of market participants for prevention of fraud and abuse and reduce prohibitive increase in compliance cost and manpower requirements for businesses. The use of these technologies also has a positive impact on internal operations and cost optimization of regulators.

BUILDING THE INFRASTRUCTURE

The importance of regulators being digital-ready to prepare for the rapid changes in the nature of business cannot be overstated. Regulators, especially in financial services, are modernizing core infrastructure and processes to be ready for the digital transformation of the sector. A selection of the different initiatives undertaken

by regulators in different countries is presented in Figure 5. In the process, regulators across the world are orchestrating an innovation ecosystem to encourage RegTech solutions. They are simultaneously transforming their internal operations to support the adoption and integration of new solutions.

Figure 5 – RegTech related projects and announcements in selected geographies



Source: Accenture Research (country-specific sources in References¹⁶)

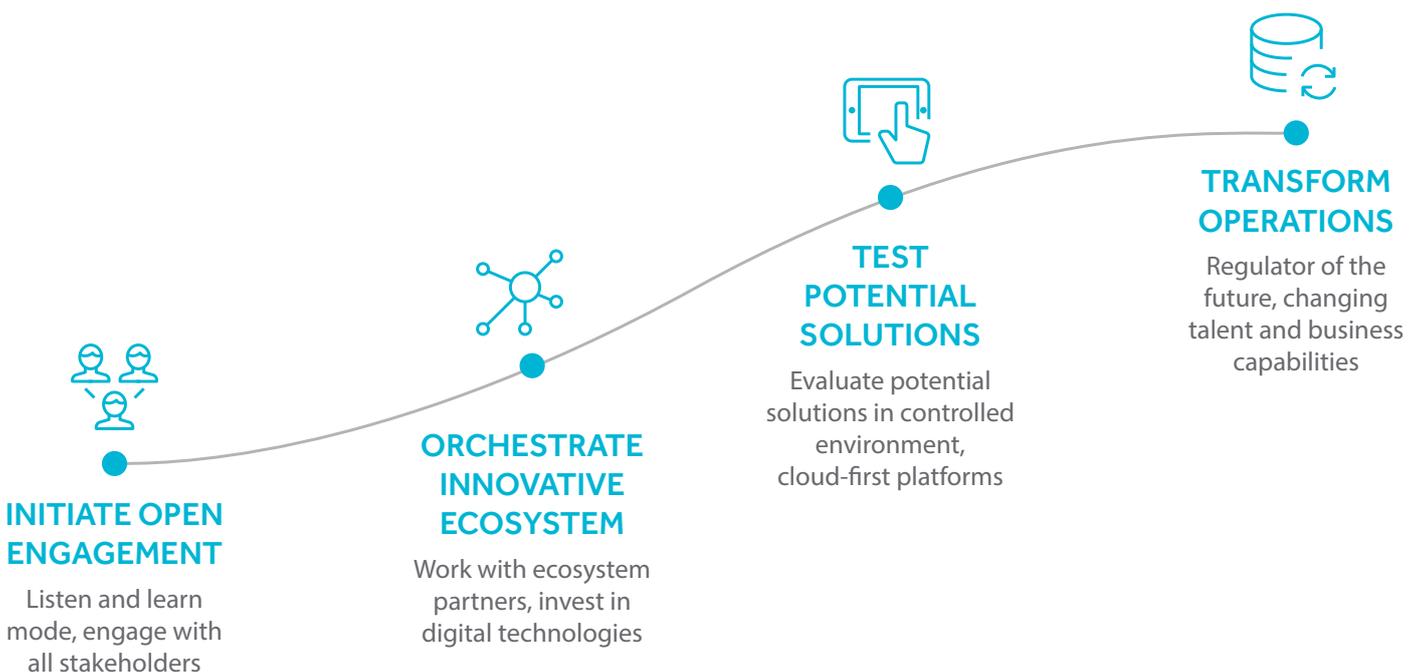
ROADMAP FOR REGULATORS

The Transatlantic Policy Working Group in its report, “The Future of RegTech for Regulators”, proposed a three-step sequential innovation framework for regulators: from developing the ecosystem to creating a digital financial infrastructure to adopting a rule and process change approach.¹⁷ In our discussions with internal and external experts – especially with Nick Cook (who leads RegTech initiatives at the UK Financial Conduct Authority) and Peter Smith (who is the Head of Policy and Strategy at DFSA) – along with a review of the literature, there emerged four key steps that regulators seeking to embrace RegTech solutions can follow. The choice of approach would, to a large extent, be dependent on the regulator’s objective, market needs and

existing infrastructure. These steps, however, can help regulators begin their journey to adopt RegTech and achieve its full potential (Figure 6).

Initiate open engagement with stakeholders: Nick Cook believes that regulators should start by engaging with the different stakeholders in the regulatory ecosystem: “Regulators need to be humble and open to listening to industry’s perspectives on the role that they should play.”¹⁸ The relationship between the regulator and the regulated also undergoes a transition – cooperative and partnering rather than adversarial. There is potential to work together with governments,

Figure 6 – RegTech adoption approach



technology startups, academia, technology service providers and industry associations to understand how technology is evolving, what it means for regulators, and how its adoption can be expedited.

- Legislative support to RegTech from the government is critical for the technology to become mainstream. As an example, the state of Arizona in the US recently passed a law to remove any legal uncertainty surrounding the enforceability of smart contracts and use of blockchain technology¹⁹
- Startups help bring cutting-edge technologies to develop new solutions. Many of these have been initiated by people who have deep industry knowledge and understand the compliance challenges that large firms face.
- Technology consulting firms provide the credibility and scale that may be lacking in some of the solutions offered by smaller specialized firms.
- Universities are actively involved in RegTech research areas to develop solutions that facilitate a more enabling regulatory environment.
- Industry associations, such as The RegTech Council and the International RegTech Association, drive advocacy efforts and support development of the ecosystem.

Orchestrate an innovation ecosystem: Creating the enabling environment requires regulators to work with ecosystem stakeholders and invest in digital technologies. The Dubai Financial Services Authority— independent regulator of financial services firms in the Dubai International Finance Centre (DIFC), a leading financial hub in the Middle East, Africa and South Asia region—has a mandate to provide a regulatory framework that promotes growth and innovation while protecting financial market stability and customers. The FinTech Hive at DIFC (launched in partnership with Accenture) is a key component. The program includes selected companies working closely with financial institutions and other stakeholders to create solutions that address the needs of the region, including those related to compliance. Among the set of finalists are Starling Trust, a US-based startup that helps financial services firms manage culture and conduct related risks, and Norbloc, a Sweden-based provider of a DLT solution for KYC/AML.²⁰

Helping regulators in this journey are initiatives such as the RegTech for Regulators Accelerator (R2A) funded by the Bill & Melinda Gates Foundation, Omidyar Network and the U.S. Agency for International Development. R2A partners with financial sector regulators to “strengthen their capacities by accelerating their innovation capabilities”.²¹ It also works with financial authorities in select markets to demonstrate market-level RegTech solutions and determine whether the innovative approach envisioned can achieve the outcomes sought.

Test potential solutions: Regulators should play a catalytic role in the development and adoption of RegTech solutions. There is merit in starting small by testing potential technologies, tools and solutions in a controlled environment. A preferred option for this is the regulatory sandbox. Regulatory sandboxes allow regulators to engage entrepreneurs more quickly and at a lower cost in a controlled setting. It is estimated that there are about 19 such regulatory sandboxes across different countries, with those in the UK and Singapore considered the most advanced.²²

DFSA, for example, allows FinTech firms to apply for a limited financial services license. The license allows qualifying FinTech firms to develop and test innovative concepts from within the DIFC without having to deal with all the regulatory requirements that would normally apply to regulated firms.²³ The DFSA works with the firms to understand the business case and establish relevant controls for customer protection. The DFSA's approach is aligned with the National Innovation Strategy set out by the UAE government to create an innovation-friendly ecosystem. In line with the goals of the Dubai 2021 strategy, the DFSA has also formalized its approach to loan-based and investment-based crowdfunding platforms.

Transform operations: The Monetary Authority of Singapore (MAS) formed a new Data Analytics Group to gain insights and enhance its supervisory effort, while reducing the cost of compliance and improving the efficiency of its operations.²⁴ The regulator

of the future will be an analytics-driven organization with data scientists, behavioral scientists and technology specialists playing a vital role. This would mean radical changes in internal infrastructure, operations and personnel. Legacy systems will have to be replaced by more agile and cloud-first platforms. Fundamental to this transition is the decision whether to build a capability in-house, use a partner or buy commercial off-the-shelf solutions. This will also mean embedding the voice of the customer as well as the regulated entities into the regulatory process and driving technological deployment to break organizational boundaries restricting the free flow of talent and ideas. MAS, for instance, set up "Looking Glass @MAS", an innovation lab that runs hackathons and promotes collaboration with industry. At the other end of the spectrum is India's effort to build an open technology infrastructure, called the India Stack, which comprises of four layers of public APIs. The "Presence-less layer" allows citizens to use their biometric identity to avail services without being physically present to verify their identity. The "Paperless Layer" avoids the use of paper by promoting digital records and eases administrative burden. The "Cashless layer" provides a single interface to digitize payments through bank accounts and wallets and even allows phone-to-phone payments, dramatically promoting financial inclusion. And the "Consent layer" will allow free and secure movement of data, which can give citizens complete control over sharing their data with organizations.²⁵

THE FINANCIAL CONDUCT AUTHORITY, UK

CASE STUDY

The Financial Conduct Authority (FCA) is the conduct regulator for 56,000 financial services firms and financial markets in the UK. It is generally recognized as one of the leaders in adopting and promoting the use of innovative technologies and solutions.

Open engagement: The FCA is closely connected with stakeholders in the Fintech and RegTech ecosystem. In November 2015, the FCA sought views from stakeholders on how the regulator could support the development and adoption of new technologies that facilitated the delivery of regulatory requirements. Stakeholders included innovative startups, accelerators, financial services firms, software and technology companies.

Orchestrating an innovation ecosystem: The FCA launched 'Project Innovate' in 2014 to provide innovators with support to navigate the regulatory system and promote competition in the interest of consumers. The FCA has also hosted a series of TechSprints that bring together RegTech market participants and identify potential solutions. For example, some of the ideas from the "Unlocking Regulatory Reporting" event in 2016 included.²⁶

- Converting the FCA Handbook into machine-readable text and using this to enable automated advice;

- Linking the Handbook to a firm's own policy documents to track the impact of any changes;
- Changing regulatory reporting from pushing reports to the FCA to the regulator's pulling the agreed data as required.

Developing and testing potential solutions:

One of the initiatives under Project Innovate is the "Regulatory Sandbox".²⁷ According to Christopher Woolard, executive director of strategy and competition at the FCA, "The regulatory sandbox was a first for regulators worldwide and underlines our deep commitment to innovation and our willingness to think outside the usual regulatory parameters. We are pleased to announce the first cohort of firms."²⁸ The regulatory sandbox allows businesses to test innovative products, services, business models, and delivery mechanisms in the real market, with real consumers.²⁹

The FCA's regulatory sandbox is in its third iteration now. In the first phase, the FCA received 69 applications from a diverse range of sectors of which 24 were accepted.³⁰ The FCA received 77 submissions for the second phase of the regulatory sandbox. This time 31 applications met the sandbox eligibility criteria and were accepted to develop towards testing.³¹ The third group will begin testing in November 2017.³²

In September 2017, the FCA in collaboration with R3, RBS and another global bank built a prototype application for regulatory reporting of mortgage transactions on a distributed ledger technology platform. The prototype application can “generate automated delivery receipts for the regulator when a mortgage is booked”³³ The delivery receipts are stored using distributed ledger technology in real-time and would potentially allow the FCA to view transactions as they happen.³⁴

Transform operations: Nick Cook highlighted the need and opportunity for regulators themselves to adopt RegTech solutions. For example, supervised machine learning is helping the FCA to prioritize its supervisory effort: applying random forest techniques on historical data to develop new predictive models. Consumer voice is amplified using tools such as social media analytics. Other initiatives include exploring the application of image recognition, natural language processing and visual analytics to identify potentially misleading advertisements. It has also trialled the deployment of graph learning and graph analytics to identify networks within financial markets to support how it monitors market activity. The FCA is also evaluating the use of several tools to make its handbook of rules easier to navigate, including a new searchable taxonomy. In addition, the FCA is exploring how to make its regulatory reporting rules fully machine readable.

REGULATION AS A PLATFORM

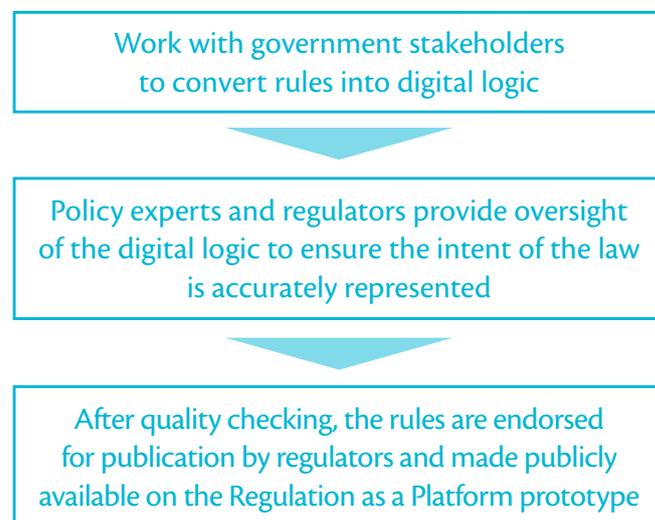
Regulation as a Platform is a holistic approach in which regulators collaborate with businesses, government entities and citizens to drive innovation and improve compliance outcomes (Figure 7). The platform is made possible through the seamless interplay of advanced capabilities such as machine learning and analytics to make it easier for business and government to understand and work with regulation.

A prototype of Regulation as a Platform is being developed in Australia, led by Data61, which is a part of the Commonwealth Scientific and Industrial Research Organization, Australia's leading data innovation group. Under the National Innovation and Science Agenda: Platforms for Open Data framework, the Australian Government seeks to maximize the value of public data for all citizens. In line with this objective, Regulation as a Platform is a proof-of-concept project that aims to maximize the value of regulation by providing "free and open access to legislation and regulation via public APIs, which will allow users to access the database of endorsed logic rules and a reasoning engine to process rules and data into accessible digital logic."³⁵

Professor Leif Hanlen, who leads digital legislation initiative at Data61, describes Regulation as a Platform as the "satnav for regulation."³⁶ He says, "in the same way that satnav is going to tell you how to get through the city without bothering to stretch the roads out and make them all neat and straight, that's

what we're trying to do for regulation. We're not trying to reform regulation but rather to make it easy to navigate on top of it."³⁷

Data61 has developed a logic reasoner called Spindle, which it uses to convert regulatory text into digital format and APIs. Using natural language processing, regulation text is scanned and the logic suggested. This approach is straightforward in prescriptive regulation. For regulation based on best practice guidelines, Data61 researchers work with regulators to ensure right interpretation and development of logic. The digital logic is coded into a single API with the aim to cover all government legislation.³⁸



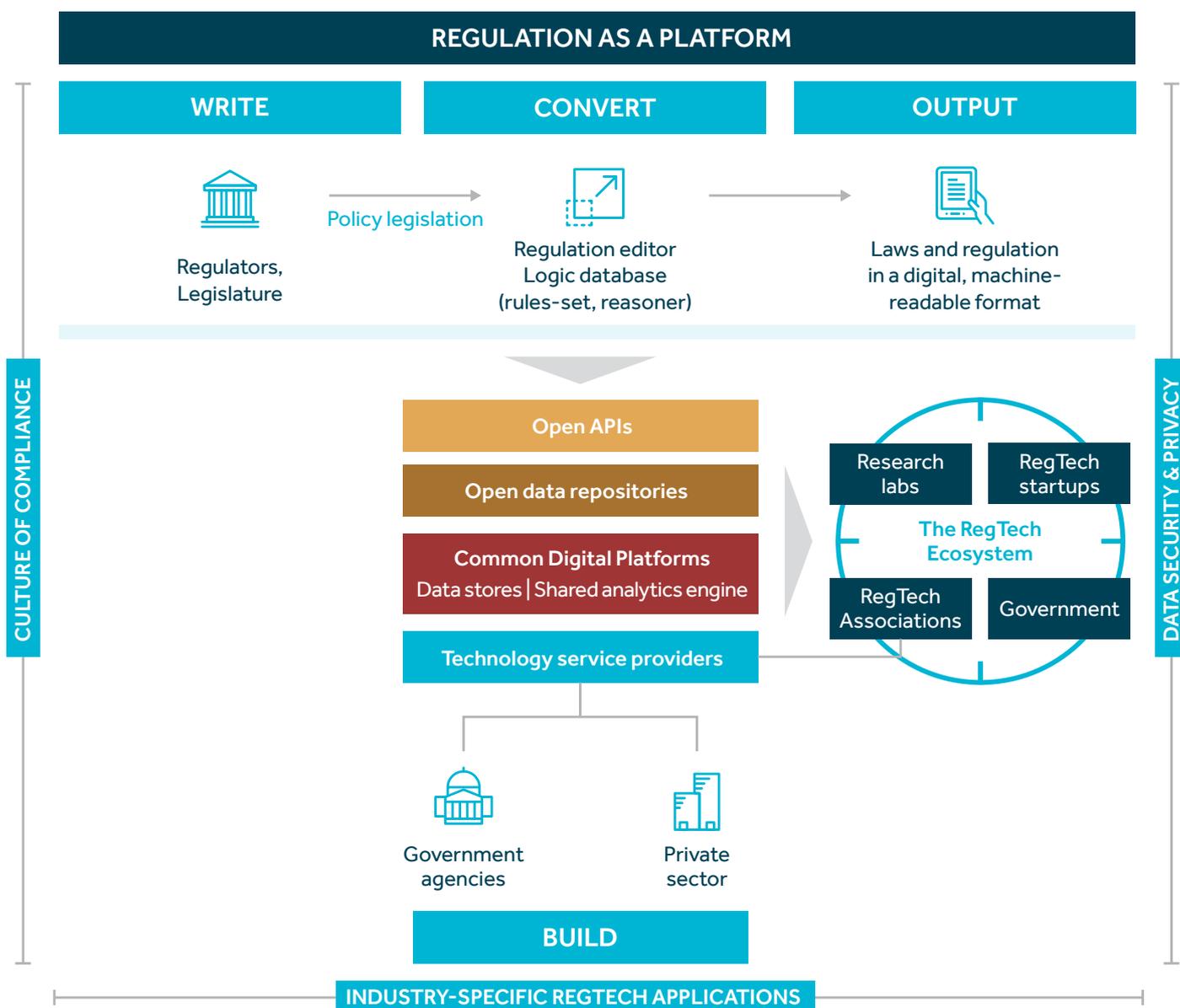
As part of its Regulation as a Platform pilot, Data61 is working with a number of government agencies. At the Australian Taxation Office, Data61 has developed a business concierge tool called 'PermitMe', which allows business entrepreneurs to apply for the required permits and licences online. They are also working with the Australian

Transaction Reports and Analysis Centre (AUSTRAC) and the Department of Finance to develop applications.³⁹

The emergence of digital legislation and regulation as a platform opens up avenues for the creation of innovative advisory applications for both regulators and business. Historically, organizations have used and tracked multiple data sources to get a better understanding of the environment they operate in by leveraging a variety

of analytics-based tools and technologies. What is now being added to this existing infrastructure is machine-readable legislation as a new data feed. Combining Regulation as a Platform with existing data and analytics can catalyze the development of innovative risk management platforms. One such innovative application is a Smart Advisor for regulators and business organizations, which Accenture is developing.

Figure 7 – Framework for regulation as a platform



Source: Adapted from Data61's Digital Legislation concept diagram

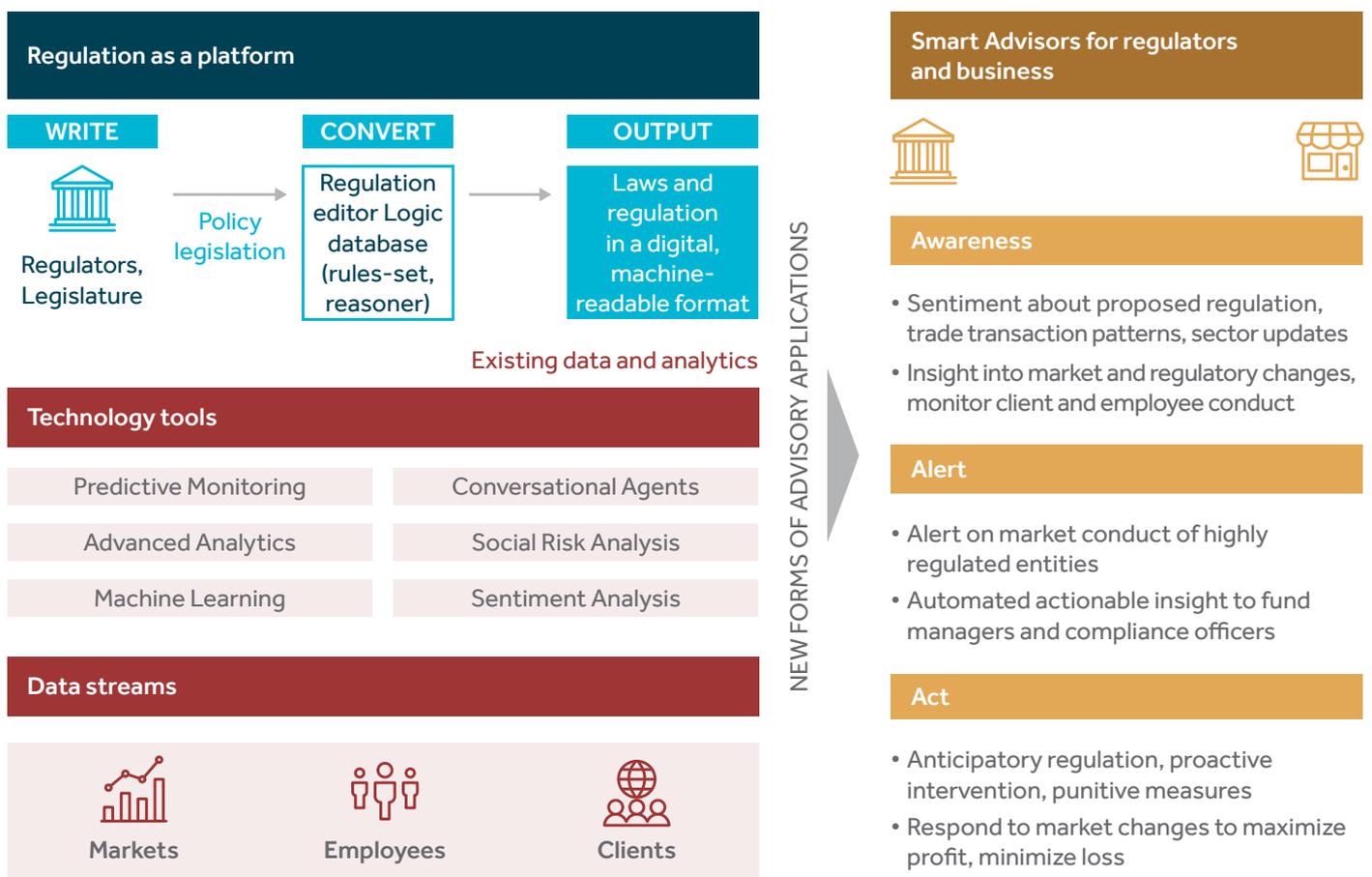
REGULATION AS A PLATFORM: A CATALYST FOR THE CREATION OF NEW ADVISORY APPLICATIONS

Accenture Labs is actively involved in developing a Smart Advisor solution for the regulatory ecosystem. The solution leverages technology tools—such as conversational agents, predictive monitoring, sentiment analysis and social risk analysis—to help officials at a regulatory agency or a business organization make better decisions leading to improved outcomes for all stakeholders (Figure 8).

Smart Advisors, built on technologies such as AI and advance analytics, have the potential to create positive outcomes for organizations in three different ways.

First, they help create **awareness** of events of significance in the outside world that have a bearing on different areas of an organization’s functioning. Machine learning based applications help in identifying patterns and

Figure 8 – Smart Advisor Solution



insights from disparate sources, not easily evident to the human eye but still requiring human judgement and intervention for an appropriate response. For regulators, this would mean the potential to gain insight into public sentiment about a proposed regulation or keeping track of trade and transaction patterns in financial markets. For business, access to digital legislation enables them to make better sense of the requirements of the law and ensure effective compliance without increasing costs. Business managers as well as compliance officers in an organization have a more informed view of what is happening across the enterprise as well as in the market. This helps reduce the ambiguity in operations and reduce risks, especially in financial service companies.

Second, Smart Advisor solutions help generate an **alert** to relevant stakeholders within an organization by assessing potential risk to the organization and assigning a score to it. The solution is able to identify potential implications of data analyzed from a number of sources and notify an official in the organization to respond in real-time. For a regulator, it is critical to be informed of any irregular or suspicious activity involving highly regulated entities in financial markets. Real-time surveillance and action is enabled by the Smart Advisor solution that ensures investor protection and market stability. Similarly, in business organizations, executives seek to be notified of major market or regulatory changes to enable them to respond adequately without compromising clients' interests and business profitability.

There is also the potential to keep track of and respond to client or employee conduct or behavior. Automated workflows enabled by the solutions add an element of certainty and trackability to enterprise risk management operations.

And finally, based on the risk score, the decision-maker in the organization can take appropriate **action** based on actionable insight provided by the solution and human judgement. The ability to intervene proactively that the Smart Advisor solution provides to regulators can be of significant value in preventing harm to investors and markets. It also allows them to keep pace with the changing nature of business and technologies and introduce anticipatory regulation.⁴⁰ Access to actionable insight enables regulators to continuously adapt rules and provisions to meet market needs. For business organizations, especially in financial services, real-time intelligence of market developments is crucial to maximize returns and negate any potential downside.

By using a combination of technologies like artificial intelligence and advance analytics, Smart Advisors provide stakeholders a better understanding of regulatory requirements and market data. This goes a long way in bridging the gap between regulatory intent and interpretation by limiting the unknown. Regulatory technologies will continue to help compliance functions innovate while managing the demands of a rapidly changing financial services business and risk ecosystem.

EVALUATING SUCCESS AND MITIGATING RISKS

Regulators need to continuously monitor and measure the effectiveness of investments in RegTech solutions. Some of the benefits are hard to measure, such as the potential benefits of moving from sample-based analysis to population review. It will require an understanding of how much harm was

prevented by such a shift, which requires an understanding of potential harm to begin with. This, however, need not stop regulators from developing metrics to measure the benefits that can be tracked and can justify investment in RegTech solutions, or suggest a course-correction.

Some of the potential outcome metrics include:

OUTCOME AREA	DESCRIPTION	KPIS
Increased efficiency	Measuring the impact of automation	Cost per transaction (manpower vs technology)
Reduction in harm	Measuring delivery of public value	\$ saved from fraud prevention activities
Decreasing cost of reporting	Measuring the use of technology to reduce duplication of effort	Cost per filing
Improved external engagement	Measuring reach and perception of initiatives among stakeholders	Customer satisfaction score Social media sentiment analysis
Modernization	Duplication of effort between institutions	Overall reduction in number
Reduced risks	Data analytics to back test through feedback loops	Number of correct risks predicted
Resource allocation	Assess the speed of approvals to allocate resources	Time taken for new approvals Time taken for online versus offline approvals Employee productivity

The benefits of RegTech solutions are obvious, but so are some of the risks associated with it. The implementation of RegTech solutions by regulators and business organizations comes with its own set of challenges:

Increased opacity:

Primary among the risks are concerns about opacity of deep learning processes in RegTech solutions driven by artificial intelligence (AI). This raises challenges in implementation of RegTech solutions that rely on the use of data that may be prohibited by law. According to Prof. Joyce O'Connor, Co-chair, Digital Future Group, The Institute of International and European Affairs, "among the GDPR's many provisions, it contains a 'Right of Explanation', which affirms the right of any EU citizen to be provided with an explanation for how an AI has come to a particular view or decision." The GDPR, along with the draft e-Privacy Regulation, reinforces the requirements for valid consent.

Data Privacy:

Some RegTech solutions could run foul with data privacy laws in some countries. The issue in some ways links up with the challenge of opacity of RegTech technology discussed earlier. Quoting O'Connor again: "The GDPR along with the draft e-Privacy Regulation together with the recent ruling by the European Court of Human Rights have affirmed employee's privacy rights to events at work. This means employers will

have to be extremely careful to ensure they have a valid legal basis for the processing of their employees' personal data and are fully compliant with all GDPR provisions".⁴¹ Reinforcing this view, Helen Dixon, Irish Data Commissioner, says, "Data protection and privacy implications need to be considered as RegTech solutions emerge and mature. Actions such as combining data sets for RegTech advances could result in additional data protection risks to the individual like increased risk in the event of a breach, unauthorized access, re-identification or incompatible further processing. These challenges can generally be surmounted through careful observance from the outset of Data Protection by Design and by Default under Article 25 of GDPR."⁴²

This means that regulators and businesses have to be cautious in using technology even for internal operational improvement, such as behavioral analysis of employees.

Cyber resilience:

Critical IT infrastructure, including the increased reliance on cloud for running RegTech applications, can be compromised by disasters or even cyber-attacks that can compromise the ability of regulators to deliver outcomes continuously. Regulators may also run the risk of compromising the integrity of data stacks through a proliferation of vendors.

Locus of responsibility:

RegTech applications also open up a profound policy question around where the locus of responsibility lies in an environment of regulatory compliance by algorithms—with people and

firms or processes run by algorithms. RegTech is still seen as a tool to augment decision making and so the liability still rests with regulated entities. This may, however, begin to change as technology takes a bigger role, raising new questions and challenges.

Systemic risks:

There is a risk that with increasing use of technology, if things go wrong, they can go wrong at scale. As stated by Peter Smith: “If it is a flaw in the programming, it will be wrong all the time. The more automation there is, the more systemic it will be”.⁴³ In this context, evaluating the security of digital legislation becomes critical. This is where regular evaluation of RegTech using clearly defined metrics can help—it can ensure that any systemic problems are captured early and steps taken to rectify them.

Cultural change:

The transition to Regulation as a Platform calls for a shift in mindset of regulators and governments. Regulatory organizations need to prepare for a scenario when all laws and regulation are digital (machine-readable) by default.

It is necessary for regulators to have their ears to the ground. When things need regulating, they need to step in quickly. To do that, there needs to be increased collaboration within the regulatory community to understand new developments and balance the risks with innovation. Regulators will also need to consider when they need to step in. For example, Robo-adviser platforms for wealth management do not need to be regulated while they are

being built and tested internally, until they reach the point when they start advertising for customers and are dealing with real clients with real money. The Monetary Authority of Singapore, for instance, has decided not to regulate cryptocurrency as it does not pose any systemic risk per se. Rather, it even believes in promoting its use if it offers greater convenience and efficiency. Its usage, however, will still be subject to regulation, to prevent money laundering for instance. In short, as with any other new product, regulators need to balance innovation with risk: they do not need to regulate the underlying technology itself, though they may be required to regulate the usage of the technology when its usage affects the ‘protected’.



BEGIN THE JOURNEY

RegTech offers a significant opportunity for regulators and regulated entities to improve compliance, reduce costs and promote innovations. Regulators can unlock the wealth of data and information that they now have access to in order to better meet their mission objectives, which means they can better monitor risks, improve their supervisory role and introduce business process efficiency.

Many regulators are now in the stage of open engagement, where they are exploring the potential benefits and challenges offered by RegTech solutions. As they take the first steps towards adopting RegTech, it may be best to find small internal use cases and test new approaches rather than go for big-bang cutting-edge solutions. To test these new approaches, they need to think of a cloud-based infrastructure and regulatory sandboxes implemented in collaboration with the industry. The first steps may include process automation, insight based trials and predictive modelling for prioritizing supervisory effort. Leveraging analytics based

on the large quantities of data made accessible by digital revolution, regulators can derive actionable insight by studying patterns and making early interventions.

Some regulators have already begun using RegTech solutions to enable a more efficient and effective regulatory environment. The Financial Conduct Authority in the UK, for example, is engaging with stakeholders to support the development and adoption of RegTech. One such initiative is the move towards machine-readable regulations for greater consistency and improved compliance.⁴⁴ Converting regulatory text to machine-readable format using natural language processing and semantic language models can help narrow the gap between regulatory intent and interpretation. Virtual assistants and chatbots can help business and individuals better understand requirements of a particular legislation or rule-book.

The next step for regulators is to think of Regulation as a Platform, which is probably still a few years away. Certain business processes are easy to automate and the benefits are obvious. This is the case with volume activities such as KYC and AML. Others require careful consideration of the potential benefits and risks of using technology. The final state may not be clear now, but the developments in technology offer the opportunity to save a lot of time and effort, reduce costs and allow

employees at regulatory agencies to take on new roles that are focused on ensuring final outcomes. This may mean rethinking the role of the regulator in multiple ways. As stated by the Transatlantic Policy Working Group in its report on “The Future of RegTech For Regulators”: “Innovations can materially change the nature of financial activity, and will require associated rule and process changes; reimaging the role of the regulator in a digitized financial market.”⁴⁵

Regulated business organizations have approached RegTech as a solution to many of the compliance and operating challenges they face. Some of the more prominent areas of application of RegTech solutions in financial services include customer onboarding, identity management, cybersecurity, data privacy, anti-money laundering, conduct monitoring, fraud prevention and compliance reporting. RegTech solutions now also find application in sectors beyond financial services. These include utilities, environment, healthcare and life sciences. With the introduction of intelligent technologies, organizations can now potentially leverage RegTech solutions to enhance their competitiveness through reduced time to market and improved customer experience.

Technology service providers emerge as the connecting tissue between the regulators, regulated and protected. Leveraging new and emerging digital technologies, they provide the necessary tools and platforms to help all stakeholders achieve their objectives. Regulators can work with technology firms to transform operations and be better equipped to respond to product innovations and consumer preferences. Regulated companies can rely on technology tools to better meet their compliance and risk management objectives.

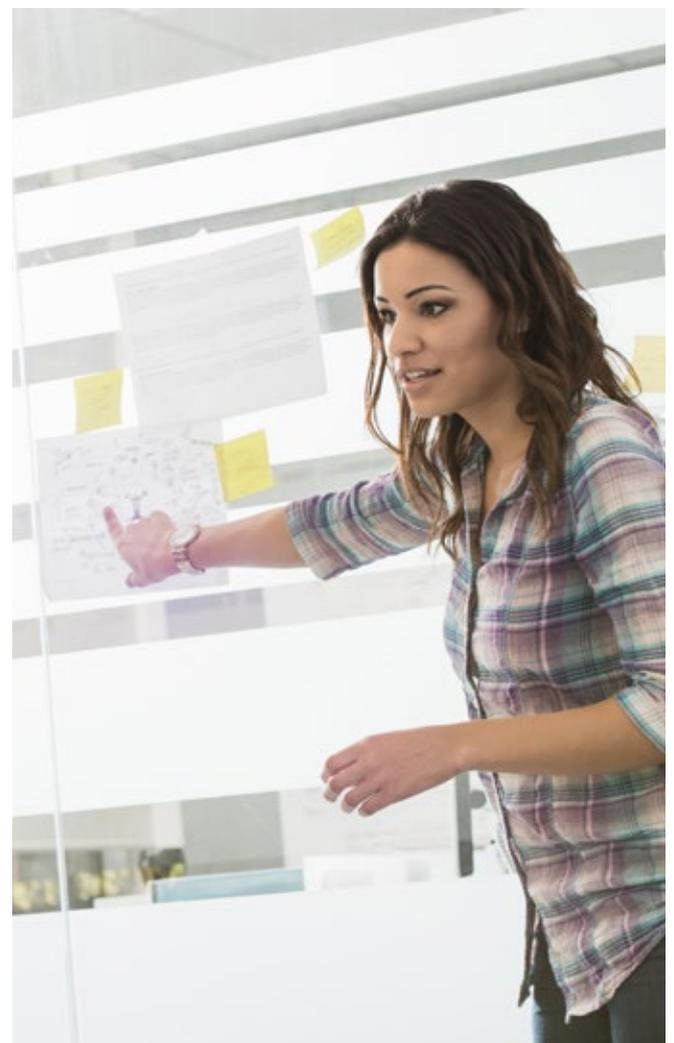
CONCLUSION

The emergence of combinatorial technologies is rapidly changing the nature of industries and business models. New technologies and platforms are spurring innovations in products, services and channels, which necessitates supporting rules and regulations. This necessity to innovate needs to be balanced with the interests of the protected. Regulators need to orchestrate an ecosystem to promote the adoption of RegTech solutions as an enabler to drive down the cost of compliance requirements and promote innovations, while ensuring that the regulatory objectives are not compromised or are met more effectively. In the process, regulators will also need to take a call on open source versus proprietary technology and custom-built versus off-the-shelf products based on their specific objectives.

In the longer term, regulators can look at Regulation as a Platform by providing free and open access to legislation and regulation, making it easier for businesses to understand

and comply with regulation. It can lead to a host of innovative applications, such as smart advisors, that can be of great value to both regulators and businesses.

The benefits, as well as risks, of using RegTech solutions are well understood. But, these will need to be monitored continuously, using key metrics to evaluate the progress and address the challenges. Regulators can take a step-by-step approach, as opposed to a big-bang change, to continuously evolve the system in pace with the changing technology landscape.



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APPENDIX 1

Potential to apply RegTech solutions varies across industries

 Banking	Increasing application of RegTech in identity management like KYC; Customer credit scoring; CRM; Credit risk analysis; Regulatory reporting; Data sourcing; Transaction monitoring; AML screening; Fraud prevention; Compliance risk analysis
 Capital Markets	Compliance services for asset managers; hedge funds; institutional investors; Fraud prevention solutions; Transaction monitoring; Trade data tracking; Compliance risk analysis
 Insurance	Financial Reporting; Underwriting; Risk Management; Transaction Monitoring; Fraud Prevention
 Healthcare	Compliance with regulatory and industry standards, such as HIPAA; Population Risk Management; Patient Health Records; Health data management; Physician/hospital transactions; Electronic Health Records; ICD compliance; Provider Reimbursements
 Life Sciences	Clinical testing; Supply chain management; FDA compliance; Contract management (with third party vendors); Service agreement monitoring; Distribution monitoring
 Energy & Utilities	Document management; Financial compliance; Production reporting; Cash management; price reporting; Risk management; Pipeline safety compliance; Environment compliance; Equipment Management; Trade Surveillance
 E-commerce/Retail	Leverage RegTech to provide identity management; Anti-fraud and Risk management services

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