

5 CHALLENGES SHAPING THE FINANCIAL INDUSTRY'S FUTURE

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Financial firms face a challenging environment as regulatory and cost pressures and rapid technological advancements are transforming the industry and evolving market structures. As financial institutions navigate through this period of change, they also need to proactively manage new and emerging issues that could have a significant impact on their bottom lines in the years to come. We've identified five key challenges that we believe will shape the future of the industry and share our insights on ways to turn them into opportunities for growth.

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Capturing the Potential of Fintech

Robert Garrison, DTCC Chief Information Officer

Fintech innovations, such as blockchain, artificial intelligence, machine learning, data analytics and robotics, hold enormous potential to dramatically transform the landscape of financial services, particularly the post-trade environment. This is great news for industry participants and the investing public, who could benefit from a reduction in risk as well as lower costs for trade processing. However, the trend we've seen during these early days is that of many market players choosing to "go it alone" instead of collaborating on the building blocks of the technology. If this continues, the industry runs the risk of creating a new and disconnected maze of siloed solutions based on different standards and with significant reconciliation challenges – all of which would limit the positive impact of these innovations on the marketplace. At DTCC, fostering collaboration and driving consensus on major industry issues are central to our mission and run deep through our history.



That is why we're taking a leadership role in promoting open source and calling for effective governance and standards models to guide the important work underway today. We've also taken several steps to advance these priorities, including serving as a founding member of the Hyperledger Project and playing an active role as a member of the Enterprise Ethereum Alliance (EEA). We're also working in partnership with Digital Asset, a blockchain developer for financial services, to explore new opportunities to leverage DLT to enhance post-trade processing and are advancing one of the most significant applications of the technology to date through a collaborative effort with IBM and Axoni.

Like we've done in the equities, fixed income, mutual funds and derivatives markets over the past 40 years, today we are helping to bring together our colleagues across the industry to brainstorm, design and build the next generation technology solutions that will power the back offices of the financial industry in the future.

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Advancing STEM Education

Susan Cosgrove, DTCC Chief Financial Officer

According to industry research, two-thirds of jobs in banking and finance today require extensive math and technology skills. Over the next 10 years, these types of positions will generate more than three-quarters of the projected job growth as the industry will increasingly depend on complex informational technology for everything from quantitative analysis to risk management to new fintech innovations. Unfortunately, there's already a lack of qualified talent with backgrounds in STEM (science, technology, engineering and math) – and studies tell us that today's young people are hesitant to pursue further education or careers in these areas for a variety of reasons. This problem may exacerbate as financial services firms compete more aggressively against the world's largest technology firms for employees.



With technology in finance advancing at a rapid pace, supporting STEM education is critical to our industry's long-term success. That is why many firms have established advancement in STEM as a top organizational priority and have dedicated time and resources to this effort. We're doing the same at DTCC, and our employees are excited to help play a role in training the future leaders of the industry. For example, in 2016, DTCC staff contributed 3,700 skills-based volunteer hours to Change the Equation, an organization that brings together business and education to advance STEM literacy. This is one of several STEM-based initiatives we're supporting, and we look forward to continuing to work collaboratively with our colleagues to make a positive difference.

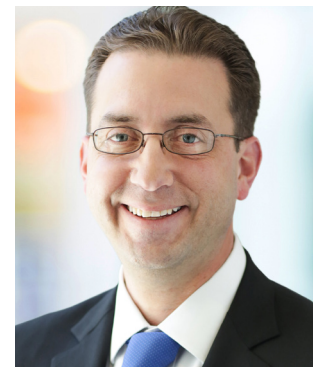
3

Defending Against Cyber Attacks

Stephen Scharf, DTCC Chief Security Officer

While all industries face the growing threat of cyber-attack, the threat is particularly acute for the financial industry due to the interconnected nature of global markets and the potential for bad actors to infect and harm the financial system. Fortunately, the industry and regulators are taking necessary steps.

In recent years, the proliferation of information sharing between the public and private sectors has proven to be one of the simplest but most effective ways to prevent or mitigate the impacts of a cyber-attack. As the benefits of information sharing become more widespread, we expect this will be a cornerstone of all future cyber programs. At the same time, as the nature of cyber risks evolve, organizations should continue to explore the latest innovations that may thwart attacks while still maintaining their focus on the basics – such as having the requisite patch management, access control and other important foundational capabilities. Conventional and routine approaches to detecting and preventing cyber-attacks are still the most effective solution in the long run. Innovation is important and should be a component of a strong cyber security plan but not at the expense of traditional practices with a proven track record of success.



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On the regulatory front, supervisors globally are increasingly focused on hardening the industry's cyber defenses through new rules and policies – a trend that will continue. It is critical that policymakers and the industry continue to work together to harmonize cyber security-related rules across jurisdictions to create a common framework. If not, the likelihood is that costs will rise and compliance could be duplicative, which could divert attention away from protecting the organization. Because the threat of cyber-attack is not going away, the industry will need to continue making it a priority and investing resources to protect against the actions of those who wish to create chaos and do harm.

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Complying with Regulations

Larry Thompson, DTCC Vice Chairman

The industry has made great strides since the financial crisis in improving market transparency and enhancing the ability of regulators and the investing public to understand the nature of risk in the financial system. Among the most important of these reforms were the new requirements detailing how derivatives were to be traded, cleared, collateralized and reported. For all this progress that's been made, one of the biggest challenges that remains unresolved is the need to harmonize data across different jurisdictions. This is critical for regulators to have a complete and holistic view of market activity.



We've been working with our colleagues across the industry and supervisors in all regions of the world to support the creation of a globally consistent core set of data elements, and a governance framework that would support and facilitate global data management and sharing. We believe this is the only way to turn the massive volume of data that's being collected today into meaningful analytical information that can be used to further mitigate risk in the derivatives markets.

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Data & Risk Management

Andrew Gray, DTCC Group Chief Risk Officer

Over the past decade, the risk management function has expanded as firms increasingly take a more holistic view of managing all aspects of risk. Consistent with this change, there is an increasing need for an enterprise-wide view of risk that takes a consistent approach to measuring and managing multiple risk types, while acknowledging the connections between them.

Enterprise data management capabilities and technologies can play a critical role by enabling the capture, storage and analysis of significant volumes of qualitative and quantitative data - both structured and unstructured. Increasingly, primary sources of data can be enriched with contextual data, while application of new technologies such as machine learning algorithms can highlight issues or anomalies in risk data.



However, the power of these new technologies is meaningless without the proper frameworks and

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disciplines for managing data. Finding reliable and complete sources of information continues to be a difficult proposition for firms. For example, the lack of common data standards and definitions, and the differences in regional reporting regimes make it difficult – if not impossible - to share and aggregate data on a global scale.

To address this complex challenge, DTCC favors consistent data standards to be adopted across jurisdictions, leveraging existing industry or other standards, where possible. One example is the Legal Entity Identifier (LEI). In fact, the Global Markets Entity Identifier (GMEI®) utility, DTCC's LEI solution offered in collaboration with SWIFT, is enabling the industry to solve a long-standing problem: how to standardize the identification of legal entities that engage in financial transactions and make the data readily accessible.



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