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# Technology highlights from 2018: Growth in artificial intelligence and modernization of the payments system

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The use and integration of technology into business and everyday life further accelerated in 2018. Both the public and private sectors in Canada have increasingly focused on and invested in technology as a way to improve efficiency and transform their businesses, particularly in the cities of Toronto, Montréal and Vancouver. The trends we covered in 2017 have continued. Although the sky-high valuations of cryptocurrency have subsided, activity in technological and financing applications of blockchain remains high.

Technologies such as artificial intelligence (AI), blockchain and other distributed ledger technologies, 3D printing, and smart devices connected to the internet of things (IoT), are having a heightened impact on traditional mainstream industries and are starting to converge. Advances in areas such as autonomous vehicles, smart cities, automated finance and investment, health care management and genomics all draw on one or more of these technologies, each of which raises novel and unique regulatory, contracting and ethical implications. The result is an extraordinarily complex and rich field for the knowledgeable legal practitioner.

Change in the payments sector is also accelerating, with alternative payment methods and new entrants (such as Stack, Ali Pay, etc.) finding their way into the market. In addition, activities in the payments sector relating to the end-to-end modernization of the Canadian payments infrastructure have begun in earnest. This modernization project, which may well be the most ambitious of its kind ever initiated worldwide, will have a significant impact on all participants in the payments ecosystem for years to come.

We discuss two of the most significant areas of development in 2018 below.

## Growing use of artificial intelligence presents legal and ethical challenges

Of all the technological advances over the past year, AI stands out. We have seen numerous examples of suppliers and users commencing the rollout of AI applications for a wide variety of uses over the past year.

AI refers to the ability of computers to replicate elements of human intelligence and behaviour. For example, in machine learning, a sub-category of AI, algorithms and mathematical models are developed to enable computers to learn and progressively improve performance, as well as make predictions or decisions based on the data available to them without requiring explicit programming of each task. An extension of machine learning, known as “deep learning,” structures algorithms in layers to create an artificial neural

network that can learn and make decisions on its own based on extensive data sets. As AI capabilities such as deep learning continue to evolve, fascinating new legal and ethical issues present themselves for users, technology lawyers and policy-makers.

Examples include:

- **Intellectual property:** The ownership of intellectual property in machine-generated algorithms is not entirely clear and needs to be managed carefully. The legislation supporting intellectual property was not written and has not been adapted to deal with machine-generated objects. There is no "author," as this concept is understood in copyright law and no "inventor," as this concept is understood in patent law. Legislators and courts are starting to grapple with these issues but the law is currently not settled.
- **Data rights:** Typically, customers of services and software view their data as a valuable asset. Consequently, agreements generally provide that property derived from or based on that data will "belong" to the customer. Machine learning generates its own data and conclusions from data. It is a point of significant discussion in current negotiations as to how to allocate ownership and licence rights for such data among the parties.
- **Privacy:** Compliance with privacy laws also requires careful consideration in the context of machine learning data use and derived Canadian law uses consent-based privacy regulation. The heart of that regime is based on providing individuals with knowledge regarding the purpose of collection and use of their personal information. As AI increases in complexity, purpose and use can become increasingly opaque.

So far in Canada, no legislation regulates AI directly. This poses challenges as users and advisers, including lawyers, determine how to comply with or apply a regulatory framework that was established without considering AI (or other new technologies) and often before any such technologies existed. There is also a perceived risk that AI will cause labour disruption as automation displaces workers.

In 2018, the federal government began to lay the groundwork for policies that will govern AI into the future. These include the following:

- **National data strategy:** The Minister of Innovation, Science and Economic Development launched a national consultation on digital and data transformation to better understand how Canada can drive innovation, prepare Canadians for the future of work, and ensure that Canadians can have trust and confidence in how their data is used. This consultation will include a consideration of new issues presented by new and emerging AI capabilities.
- **Copyright review:** As part of its review of the *Copyright Act*, the Minister of Innovation, Science and Economic Development is considering submissions regarding a new exception that would allow for unlicensed use of lawfully acquired works in connection with machine learning and other AI techniques that involve information analysis.
- **PIPEDA:** There is increased discussion of the need to enable responsible use of personal information that is not reliant on informed consent.
- **Transparency**: The Government of Canada has published a draft Directive on Automated Decision-Making that addresses, among other issues, principles to ensure transparency and accountability in connection with the government's use of AI.

- **Governance:** Canada hosted the G7 Multi-stakeholder Conference on AI. The discussion focused on how to enable environments that foster societal trust and the responsible adoption of AI, while building upon a common vision of human-centric AI.

These initiatives represent the first steps in what will ultimately be a concerted, multi-year effort to wrestle these and other legal and ethical issues to ground. Achieving an appropriately balanced regulatory framework that will effectively promote the growth of AI within Canada and address the novel legal and ethical risks and issues that AI presents will not be quick or easy. In the meantime, in the absence of AI-specific regulatory or legislative oversight, it is especially important that the allocation of the risks and responsibilities associated with the issues presented by AI are addressed by parties contractually.

On the international front, standards are emerging that will assist with the proliferation and adoption of AI. This year, the recently formed joint committee of the IEC and ISO (the ISO/IEC JTC 1/SC 42), tasked with carrying out standardization activities for AI, held its inaugural meeting. It established priorities that include: (1) establishing foundational standards that provide for a framework and common vocabulary for AI; (2) addressing trustworthiness issues such as reliability, accuracy, safety, security and privacy; and (3) identifying specific AI application domains (e.g., social networks and embedded systems) and the context of their use (e.g., FinTech, healthcare, etc.), which SC 42 will take into account when developing AI standards.

Heading into 2019, we expect to see the pace of introduction of AI into our clients' businesses to accelerate and continue to present new legal challenges.

## Payments system modernization is underway

**Introduction of new systems** In late 2017, Payments Canada, the federally delegated organization responsible for the clearing and settlement infrastructure, processes and rules essential to payment transactions, issued its in-depth view of the target end state for payment system modernization in Canada, including the infrastructure, rules and standards that will apply. The target end state described by Payments Canada addresses core systems and their fundamental support structures, such as risk and regulatory requirements, access and settlement models and technology platforms.

Payments Canada's goal is to modernize the Canadian payments systems to enable fast, secure, flexible, data-rich payment and settlement capability. The target state described by Payments Canada focuses on three new systems, which will operate under an enhanced risk, regulatory and rules framework that appropriately balances the need for safety and soundness with accessibility to spur innovation:

- **Lynx:** Lynx will replace the current Large Value Transfer System. Lynx is a high-value payment system that facilitates secure, real-time payments with transaction finality and supports settlement of other payment networks and financial market infrastructures.
- **Retail clearing with enhanced batch payments (or SOE):** A new system will replace the existing Automated Clearing Settlement System and U.S. Bulk Exchange. The new system will clear retail batch payments and will also enable faster and more convenient automated funds transfers – a payment type typically associated with payroll and bill payments.
- **Real-time rail:** This new, always-on payments infrastructure will support immediate payments. The real-time rail will enable fast, convenient payments and funds transfers and will be a platform for future innovation, where participants in the payment system can

connect and develop new ways for Canadians to pay for goods and services and transfer money.

A consultation on Payment Canada's proposed target state was completed in the first part of 2018.

The payment system modernization initiative is extraordinarily complex. Fundamental to each system is the introduction of the ISO 20022 payment messaging standard, which enables the flow of more data with payments. In addition to the need to replace legacy systems to meet the ISO 20022 messaging standard, systems will need to be designed to meet new payment rules and regulatory standards, not just within Canada but internationally. New issues and challenges that this initiative will present include, for example:

- Technology projects required for payments modernization have actively commenced with many of our clients in 2018. While the ISO 20022 messaging standard is a known requirement, many of the future state requirements for modernized payments systems are in flux, and will continue to be developed in the years to come. Payments ecosystem participants will need to adopt an approach to modernization that will be capable of adapting in real time as these requirements evolve.
- The payments infrastructure and ecosystem involves large numbers of participants and numerous systems within each participant — this poses significant data and systems integration challenges for every participant.
- Transition from the current state payments systems to the future modernized state will be complex and risky. Payments ecosystem participants will be modernizing at different times, and, as noted, requirements will be evolving in parallel. Managing operational risk in such mission critical systems as part of the modernization journey will be a very difficult task.
- A key element of the target future state will be the ability to send data-rich payments. Within the real-time rail in particular, ecosystem participants will have opportunities to develop overlay capabilities that leverage this new data-rich functionality. This new world of data-rich payments will present novel privacy issues. As we move into a world with multiple ecosystem participants, many of which may have shared accountability for the data that is involved, issues will increasingly arise relating to consent, fraud and data security (among others) that the underlying framework of PIPEDA may not be well equipped to address.

**Project Jasper** This fall, Payments Canada, in collaboration with the Bank of Canada, TMX Group, Accenture and R3 published its findings from the third phase of Project Jasper. Project Jasper is a collaborative research initiative to experiment with an integrated securities and payment settlement platform based on distributed ledger technology (DLT). The conclusions were that DLT is capable of use in payment and securities settlement systems, though the project scope was not sufficiently broad to determine whether significant cost savings or efficiencies could be achieved.

We expect that activity in the payments area and payments modernization will continue to expand and grow in significance and complexity into 2019 and beyond.