# Regulating Disruption

## Governing in an era of rapid technological change

BY SUNIL JOHAL & MICHAEL CRAWFORD URBAN

# Mowat Centre
### ONTARIO'S VOICE ON PUBLIC POLICY

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# Acknowledgements

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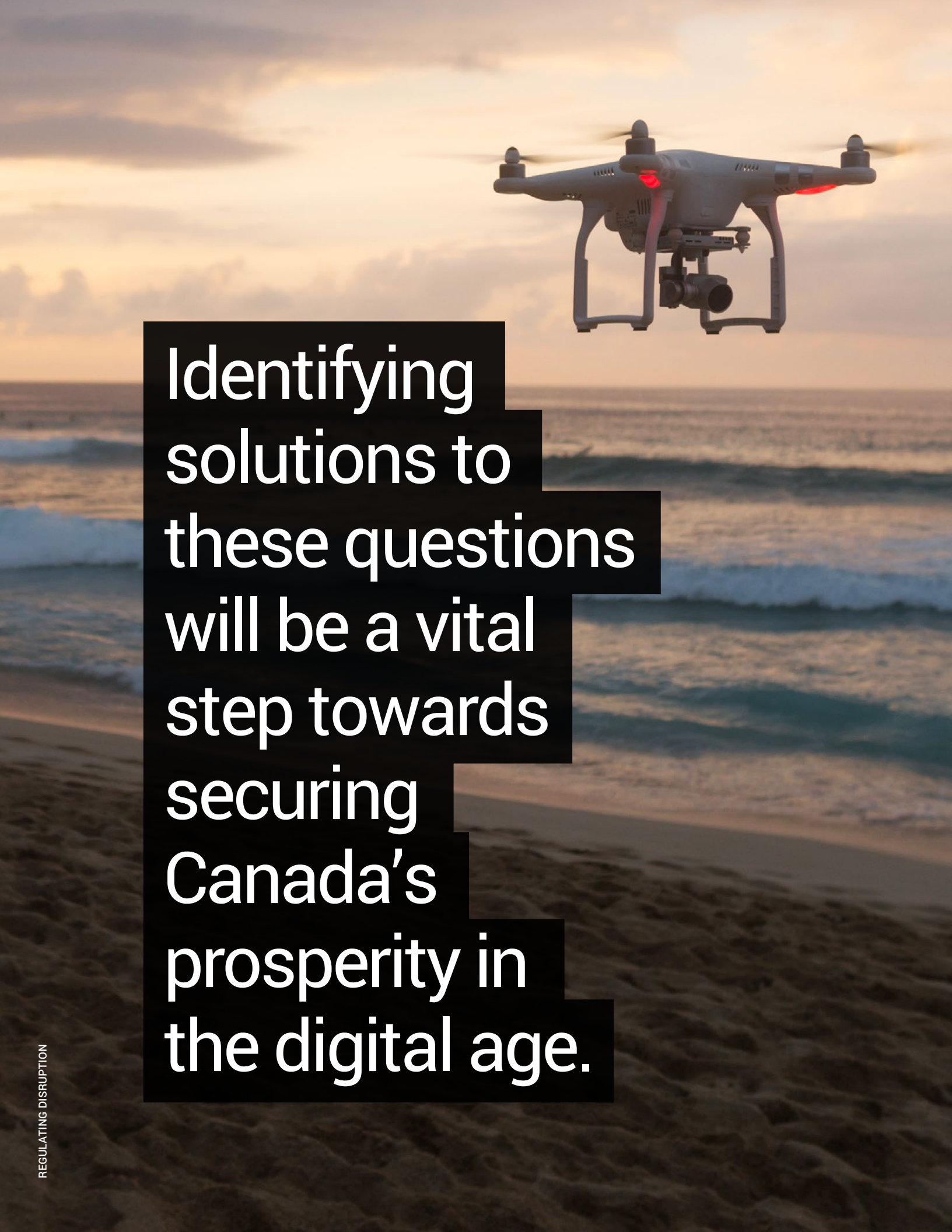439 UNIVERSITY AVENUE
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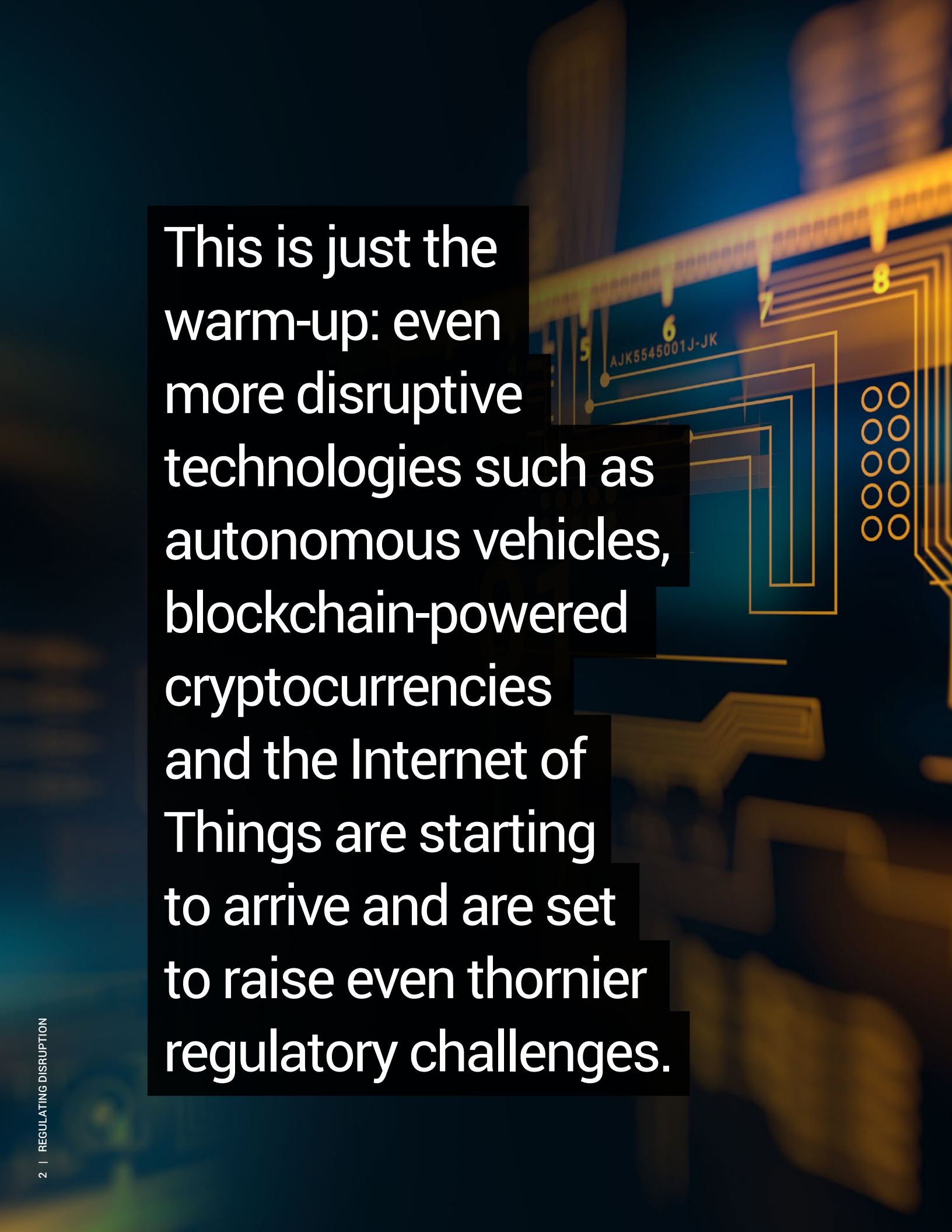
# EXECUTIVE SUMMARY

Governments across the world are scrambling to respond to the arrival of innovative new digital services such as Uber, Netflix and Airbnb. While these services promise great benefits for Canadians, they also pose novel regulatory challenges to how governments are structured, engage with stakeholders and hire and train their staff.

How should governments regulate global services headquartered in other jurisdictions but available digitally within Canada? How can governments engage and encourage innovators and balance their needs with other stakeholders when government agencies struggle to hire and retain personnel who understand the technical issues involved? How can regulators successfully reconcile the deliberate pace of regulatory processes with the accelerating speed of innovation?

Identifying solutions to these questions will be a vital step towards securing Canada's prosperity in the digital age. Other countries have already launched serious efforts aimed at reducing the burden of regulation as well as other measures designed to make their regulatory systems more innovation-friendly. Without renewed attention to this issue, Canada risks being left behind.

This report argues that Canadian governments can and should undertake a serious and sustained effort to bring their regulatory practices and culture out of the industrial age and into the digital age. Canadian governments have the opportunity to significantly boost innovation in several exciting ways, ranging from a greater embrace of design thinking in their regulatory design processes, to the initiation of programs for enhancing technological capacity within government, to the development of new tools to ensure vigorous competition in digital markets. By leveraging these opportunities, governments can make a significant and positive contribution to Canada's future and ensure Canadians are well-positioned to promote and reap the benefits of innovation.

This is just the warm-up: even more disruptive technologies such as autonomous vehicles, blockchain-powered cryptocurrencies and the Internet of Things are starting to arrive and are set to raise even thornier regulatory challenges.

# 1 INTRODUCTION

Digital technologies are reshaping industries, creating new markets and transforming consumer experiences and expectations around the world. What's more, all of this is happening rapidly and with few clear precedents available to guide policymakers.

For governments used to carefully assessing trends and then spending many months or even years on due diligence before introducing or amending rules, this accelerating pace of change presents a challenge. Move too slowly, and regulators risk leaving the public vulnerable or falling out of step with market realities. Move too quickly, and they risk stifling innovation.
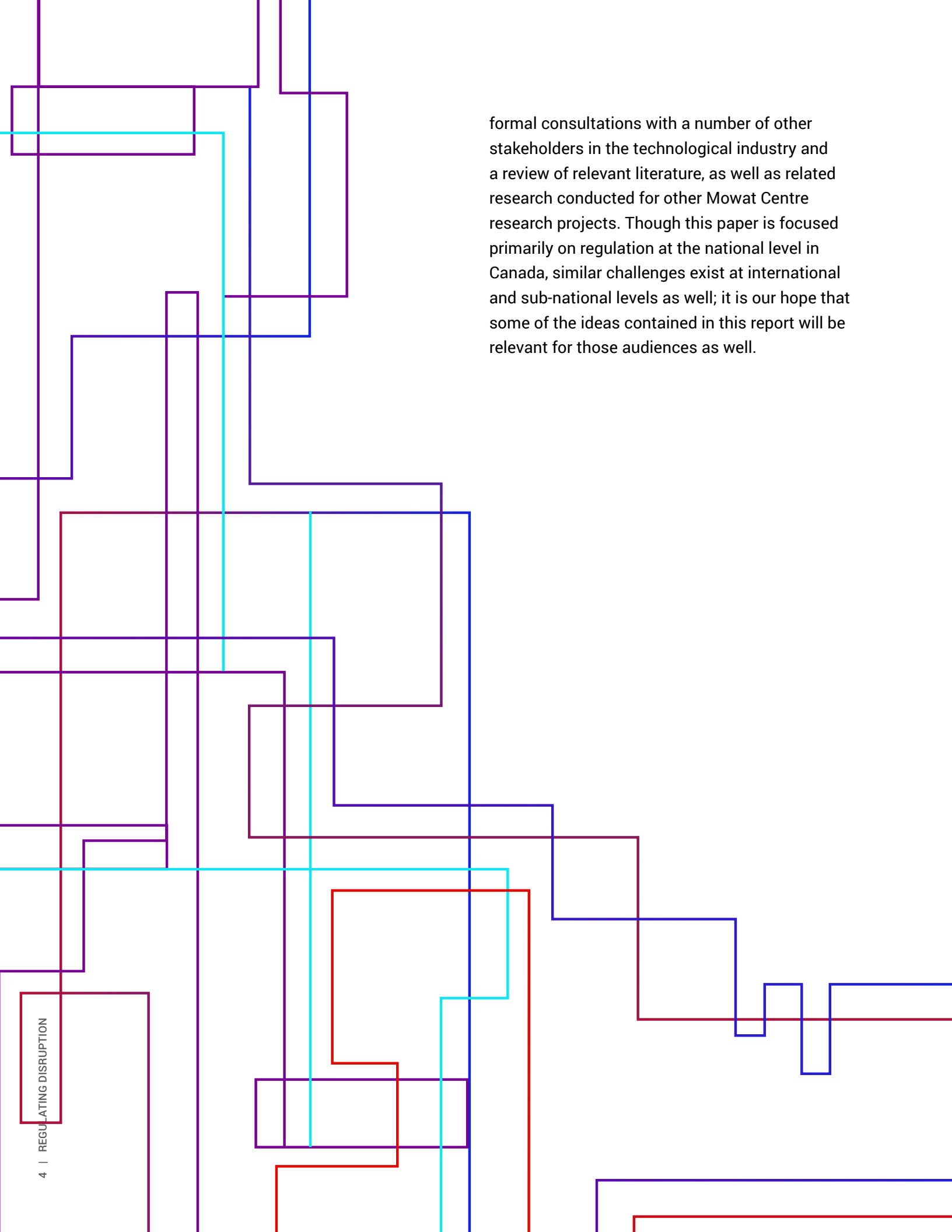
Whether it's court battles between Apple and the US government over data encryption, the Canadian Radio-television and Telecommunications Commission (CRTC) grappling with the impacts of streaming services such as Netflix on the television landscape or the ongoing municipal struggles to regulate Uber and Airbnb, technological innovations – and the new business models they enable – are posing a host of tough questions for governments and regulators. And this is just the warm-up: even more disruptive technologies such as autonomous vehicles, blockchain-powered cryptocurrencies and the Internet of Things (IoT) are starting to arrive and are set to raise even thornier regulatory challenges.

How can government policymakers keep up with the groundswell of changes facing them in the years to come? How can we update our regulatory frameworks for a digital age, and how can approaches to developing regulations be reformed? And how can we do all this without stifling innovation and its associated benefits?

This paper aims to answer these questions by exploring some of the key trends associated with digital technologies and discussing why and how these trends represent challenges for governments. It also examines how the structure of governments, the manner in which they engage stakeholders, and the capabilities and competencies they possess shape their ability to design effective regulatory frameworks.

Canada is not alone in grappling with these issues and this report highlights how some leading jurisdictions are moving forward with novel approaches. Building on this analysis, the report closes by suggesting a potential path forward for Canadian policymakers complete with a number of concrete recommendations.

The analysis contained in this report is based on 16 structured individual interviews conducted in 2016. Interviewees included public servants, regulators, representatives of industry associations and business, as well as academics. The report also draws on less

formal consultations with a number of other stakeholders in the technological industry and a review of relevant literature, as well as related research conducted for other Mowat Centre research projects. Though this paper is focused primarily on regulation at the national level in Canada, similar challenges exist at international and sub-national levels as well; it is our hope that some of the ideas contained in this report will be relevant for those audiences as well.

# 2 KEY TRENDS

Increasingly, several trends are defining the accelerating pace of technological innovation. These key trends – which include the increasing automation of work; the rise of peer-to-peer and platform-based business models; the mobile Internet; growth in big data analytics; improvements in artificial intelligence; digitization; and the increased pace of change – are combining to create new and important challenges for regulators in the 21st century.[1]

In this section, we present three case studies focused on illuminating how some of these developments are manifesting in the real world. In so doing, each of these case studies also helps to demonstrate how the development of new technologies is creating novel challenges for regulators. The trends highlighted here are by no means the only ones that policymakers and regulators need to be aware of. Critically, however, many of the same principles discussed here will be applicable across a variety of other issues.

## Video Streaming

The story of mass adoption of online video streaming services has, to date, been defined by the story of Netflix. Digitization is at the centre of Netflix' innovative service, and offers an instructive example of its economic benefits. Netflix began as a more traditional business through which customers rented and returned DVDs through the mail. Recognizing that its business model was vulnerable to disruption, Netflix tackled the innovator's dilemma[2] head on and disrupted itself by launching an "Over The Top" (i.e. over the Internet) video streaming service.[3] In April 2016, it was estimated that 5.2 million Canadian households subscribed to Netflix – an increase of more than a million subscriptions over the preceding year.[4]

Netflix' strategy is built on a recognition that its primary competitive advantage lies in the low prices that its digital business model – which includes the ability to scale rapidly at low

1 See Johal, S. and Thirgood, J. 2016. *Working Without a Net: Rethinking Canada's social policy in the new age or work*. The Mowat Centre. https://mowatcentre.ca/working-without-a-net/; Johal, S. and Zon, N. 2015. *Policy-making for the Sharing Economy: Beyond Whack-A-Mole.* The Mowat Centre. https://mowatcentre.ca/policy-making-for-the-sharing-economy/; and Ditta, S. and Urban, M. with Johal, S 2016. *Sharing the Road: The Promise and Perils of Shared Mobility in the GTHA*. The Mowat Centre. https://mowatcentre.ca/sharing-the-road/ for discussions of some of the impacts of these innovations.

2 Term coined by Clayton Christensen to describe the challenge incumbent businesses face when adapting to disruptive technologies that will likely spell the end of their existing business model. See Lepore, J. 23 June, 2014. "The Disruption Machine." *The New Yorker*. http://www.newyorker.com/magazine/2014/06/23/the-disruption-machine for a discussion.

3 Steel, E. 26 July, 2015. "Netflix Refines Its DVD Business, Even as Streaming Unit Booms." *The New York Times*. http://www.nytimes.com/2015/07/27/business/while-its-streaming-service-booms-netflix-streamlines-old-business.html?_r=0.

4 Jackson, E. 14 June, 2016. "Netflix lands over a million new Canadian subscribers in less than one year: report." *The National Post*. http://business.financialpost.com/fp-tech-desk/netflix-lands-over-a-million-new-canadian-subscribers-in-less-than-one-year-report?__lsa=910a-e384.

FIGURE 1
## Estimated Growth in Netflix Subscribers
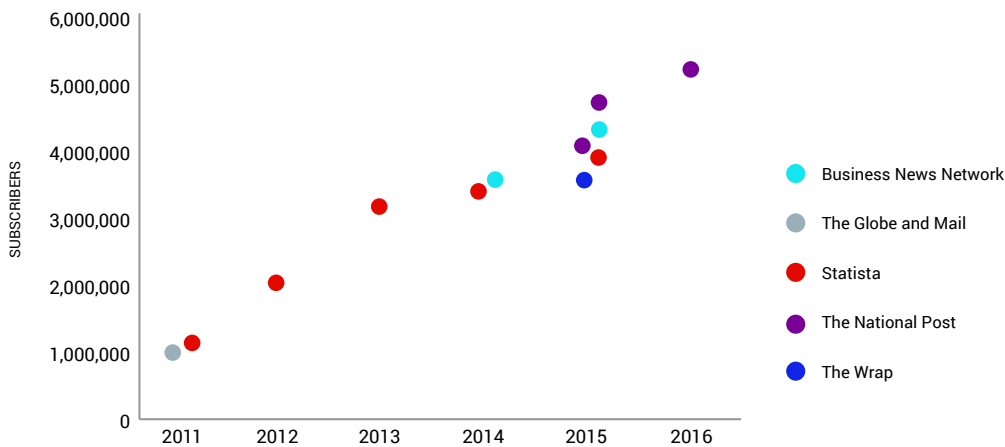


Note: Since Netflix no longer releases subscriber data by country, we are forced to rely on estimates of the number of Canadians who subscribe to the service. This scatterplot combines estimates from five different sources to provide a balanced estimate of Netflix' growth. The following sources were used: Erlichman, J. 18 April, 2016. "Why Netflix's Canadian sales may top half a billion dollars a year". *Business News Network*. http://www.bnn.ca/talent/why-netflix-s-canadian-sales-may-top-half-a-billion-dollars-ayear-1.473874; Oliveira, M. 20 September, 2013. "Netflix doubles subscriber base in Canada, survey says". *The Globe and Mail*. http://www.theglobeandmail.com/technology/business-technology/netflix-doubles-subscriber-basein-canada-survey-says/article14433587; Statista, *Number of Netflix paying streaming subscribers in Canada from 4th quarter 2011 to 4th quarter 2015 (in millions)*. https://www.statista.com/statistics/324066/canada-netflix-subscribers ; Jackson, E. 14 June, 2016. "Netflix lands over a million new Canadian subscribers in less than one year: report". *The National Post*. http://business.financialpost.com/fp-tech-desk/netflix-lands-over-a-million-new-canadian-subscribers-in-less-than-one-year-report; Maglio, T. 17 April, 2015. "Netflix Global Subscribers by Country: Canadians Lead the Pack (Photo)". *The Wrap*. http://www.thewrap.com/netflix-global-paid-subscribers-by-country-canada-wins-photo.

marginal cost – enables.[5] But just as digitization has enabled Netflix' meteoric growth, it also makes Netflix vulnerable to similar challenges from other firms.[6] In response, Netflix is attempting to protect itself through aggressive expansion of its market share, even if this means low profit margins in the short term.[7] Strategies of this type, often closely identified with successful online retailing pioneer Amazon.com, are common in the digital marketplace.[8]

Netflix' second main advantage is the revolutionary convenience of its product. But, while previously distinguished by its superior content library and lack of peer competitors, the rise of competing streaming services (e.g. AmazonPrime, Hulu and CraveTV) is eroding Netflix' early advantages in convenience, content and cost. Moreover, the sheer volume of content available on Netflix has also started to overwhelm customers, thereby increasing the importance of its content's "discoverability."[9] Conscious of these challenges, Netflix has invested heavily in artificial intelligence research as it attempts to rebuild its advantage in convenience by providing

5  House of Lords, 2016. *Online Platforms and the Digital Single Market*. House of Lords Select Committee on the European Union: 10th Report of Session 2015-2016.
6  BNN Video. 19 January, 2016. "Trader: Netflix won't be a major player a year or two from now." *The Globe and Mail*. http://www.theglobeandmail.com/video/video-trader-netflix-wont-be-a-major-player-a-year-or-two-from-now/article28270531/ Begin watching at 4:10 into the video.
7  Vigna, P. 24 July, 2015. "Apple and Amazon Take Part in a Keynsian Beauty Contest." *The Wall Street Journal*. http://blogs.wsj.com/moneybeat/2015/07/24/amazon-and-apple-take-part-in-a-keynesian-beauty-contest/.
8  Stone, A and Aley, J. 8 January, 2013. "Amazon's Jeff Bezos Doesn't Care About Profit Margins." *Bloomberg*. https://www.bloomberg.com/news/articles/2013-01-08/amazons-jeff-bezos-doesnt-care-about-profit-margins.

9  Discoverability refers to the ability of a piece of content to be found or "discovered" by a consumer. In the modern digital media environment, where there is an abundance of content available relatively easily, content producers face the challenge of having consumers discover their content amidst the, often overwhelming, plethora of options available. See Doyle, J. 6 December, 2015." John Doyle: CRTC should listen to TV critics, just like everyone else." *The Globe and Mail*. http://www.theglobeandmail.com/arts/television/doyle-crtc-needs-to-listen-to-tv-critics-just-like-everyone-else/article27610850/ for a discussion.

viewers with better content suggestions.[10] It has also re-invested significant proportions of its revenue into becoming one of the largest producers of original video content, thus using its advantage in one market to encroach on another one.

By providing attractive content conveniently and at a low cost, Netflix has generated significant demand for its offerings. When combined with the technical difficulties that would be involved with regulating Netflix or restraining Canadians' access to it, customer demand has induced regulators and legislators to hold off on attempts to fit Netflix into existing regulatory frameworks.[11] While popular, this stance raises important regulatory challenges. Netflix' ability to escape the responsibilities imposed by the current Canadian-content regime – let alone Canadian sales taxes – offers it a significant competitive advantage *vis-à-vis* providers who are regulated under this regime.[12] In so doing, Netflix and its new competitors represent a threat to the viability of the Canadian government's current system for "providing a wide range of programming that reflects Canadian attitudes, opinions, ideas, values, and artistic creativity."[13]

# Ride-sourcing

Like Netflix, the rise of ride-sourcing firms such as Uber and Lyft (firms that offer on-demand rides in another person's vehicle arranged through an Internet-based application) has also been powered by digitization. In particular, these firms have benefited from the digitization of maps and location information as well as the massive "capital-lite" scaling at low marginal cost that digitization enables. Digitization has also allowed Uber to capture the large quantities of data generated by their rides. Data analytics help Uber identify new commercial opportunities, develop new offerings, improve the efficiency of its critical algorithms, and improve its services overall.[14]

The exploding popularity of ride-sourcing has confounded regulators and policymakers worldwide.[15] By offering transportation services that are often cheaper and more convenient, ride-sourcing firms are disrupting the traditional taxi and limousine industries. Much of ride-sourcing's competitive advantage stems from its innovative technology and business model, such as its algorithm that matches requests for rides with available drivers using riders' and drivers' smartphones' built-in location-sensing functionality. But, in a manner that is similar to an increasing number of digital firms, a significant portion of this advantage also stems from Uber's aggressive approach to regulation and taxation.

10  Russell, K. 11 February, 2014. "Netflix Is 'Training' Its Recommendation System By Using Amazon's Cloud To Mimic The Human Brain." *Business Insider*. http://www.businessinsider.com/netflix-using-ai-to-suggest-better-films-2014-2 and The Economist. 9 February, 2017. "How to devise the perfect recommendation algorithm." *The Economist*. http://www.economist.com/news/special-report/21716464-recommendations-must-be-neither-too-familiar-nor-too-novel-how-devise-perfect.
11  Barlow, S. 21 September, 2015. "Technology, politics and the remaking of the Canadian economy." *The Globe and Mail*. http://www.theglobeandmail.com/report-on-business/economy/economic-insight/technology-politics-and-the-remaking-of-the-canadian-economy/article26460393/.
12  Stursberg, R. 12 January, 2017. "Canada's broadcasters pay tax to support our industry. Netflix and other U.S. content firms should, too." *The National Post*. http://business.financialpost.com/fp-comment/canadas-broadcasters-pay-tax-to-support-our-industry-netflix-and-other-u-s-content-firms-should-too.
13  Canadian Radio-television and Communications Commission. 15 June, 2016. "Content that Meets the Needs and Interests of Canadians." *TV & Radio*. http://www.crtc.gc.ca/eng/cancon/mandate.htm.

14  Marr, B. 7 May, 2015. "The Amazing Ways Uber Is Using Big Data." *Data Science Central*. http://www.datasciencecentral.com/profiles/blogs/the-amazing-ways-uber-is-using-big-data and Matys, C. 3 February, 2015. "Data Science Disruptors: How Uber Uses Applied Analytics For Competitive Advantage." *Georgian Partners*. https://georgianpartners.com/data-science-disruptors-uber-uses-applied-analytics-competitive-advantage/.
15  Schechner, S. 9 March, 2016. "Uber Wins a Round for its App in France." *The Wall Street Journal*. http://www.wsj.com/articles/uber-wins-a-round-for-its-app-in-france-1457546610 and The Canadian Press. 27 February, 2016. "Uber Alberta says it will shut down Tuesday unless province agrees to changes." *The Globe and Mail*. http://www.theglobeandmail.com/news/alberta/uber-alberta-says-it-will-shut-down-tuesday-unless-province-agrees-to-changes/article28940259/.

As with Netflix, this stance is putting current regulatory frameworks for vehicles-for-hire under considerable strain.[16]

Ride-sourcing firms' regulatory positioning is centred on the claim that they are not actually transportation companies; rather, they claim that they are technology companies which provide and maintain peer-to-peer (P2P) platforms through which independent entrepreneur "driver-partners" offer their services to customers. Such P2P marketplaces have become very popular in the past 20 years as the Internet has made them more effective by vastly increasing the number of potential buyers and sellers and by making it easier for them to find and transact with one another. Essentially, Uber claims that it is more like online auction house eBay than a taxi company. This is important because it uses this idea to support the claim that its drivers are its customers, not those who pay for rides.[17]

# The exploding popularity of ride-sourcing has confounded regulators and policymakers worldwide.

The business models of the firms providing the platforms for these marketplaces, and the "multi-sided" markets they create, raise many important regulatory questions.[18] For instance, classifying drivers as independent contractors is financially advantageous for Uber as it potentially absolves it of the need to collect taxes, worry about its drivers' insurance responsibilities, provide benefits, or even meet minimum wage requirements. But this classification is highly contested and Uber has frequently found itself embroiled in legal disputes with drivers and regulators on this, as well as many other, issues.[19]

16  Cramer, J. and Krueger, A. 2016. "Disruptive Change in the Taxi Business: The Case of Uber." *American Economic Review*, 106(5) 177-182 and Powell, B. 21 July, 2015. "Uber says drivers are expected to collect HST." *The Toronto Star*. http://www.thestar.com/news/city_ hall/2015/07/21/uber-says-drivers-are-expected-to-collect-hst.html See also Haavardsrud, P. 22 January, 2016. "Analysis Uber playbook: Why the ride-hailing app will be coming soon to a city near you." *CBC*. http://www.cbc.ca/news/business/uber-playbook-taxis-canada-1.3411401 and Reevley, D. 6 January, 2016. "Reevely: Insurance companies prepare to insure Uber drivers." *The Ottawa Citizen*. http://ottawacitizen.com/news/local-news/reevely-insurance-companies-prepare-to-insure-uber-drivers.

17  Formby, B. Wilonsky, R. Aguilera, J. September, 2015. "Uber drivers continue strike while awaiting decision from company." *Dallas News*. http://transportationblog.dallasnews.com/2015/09/dozens-of-uber-dallas-drivers-protest-transportation-companys-west-end-offices.html/.

18  House of Lords. 2016. *Online Platforms and the Digital Single Market*. pg. 24.

19  Reuters. 5 October, 2015. "Legal troubles — including 173 lawsuits in the US — threaten Uber's global push." *Business Insider*. http://www.businessinsider.com/r-legal-troubles-market-realities-threaten-ubers-global-push-2015-10; Peat, D. 19 January, 2016. "City has laid 120 charges against Uber since October." *The Toronto Sun*. http://www.torontosun.com/2016/01/19/city-has-laid-120-charges-against-uber-since-october and Davies, R. 3 March, 2017. "Uber loses court case to block English-language written test in London." *The Guardian*. https://www.theguardian.com/technology/2017/mar/03/uber-loses-court-case-english-language-test-london.

# Coming Soon: The Blockchain

While still absent from many policymakers' and regulators' radar screens, the challenges posed by blockchain technology are likely to create some of the most significant technology-driven tests that governments and regulators will face in the next quarter century.

Blockchain is the name given to the technology that underpins the new wave of virtual "cryptocurrencies" which have emerged in recent years, of which Bitcoin is the most well-known example. A blockchain is a software application that acts as a digital ledger which lists ownership of a set of assets as well as the transaction history for those assets. The information contained in the ledger is hosted by a number of computers that together form a distributed P2P network. Unlike many other networks, however, the nodes that collectively form this network work together to keep time-stamped records of all transactions that have ever occurred on the blockchain.

Any new transaction posted to the blockchain is verified by these nodes to ensure that it is consistent with the history of transactions that already exist. Once a transaction occurs it is "sealed" into a new "block" and added to the "chain" where it can be viewed by anyone who has permission to do so. Some blockchains are private and only certain entities with specific permissions can view the blockchain or make transactions on it while others, such as the Bitcoin blockchain, are completely public and open to anyone to examine or transact on.

## FIGURE 2
### Bitcoin – Price Growth (XBT to CAD)



Source: XE. *XE Currency Charts: XBT to CAD*. http://www.xe.com/currencycharts/?from=XBT&to=CAD&view=10Y.

Many commentators see blockchains as exciting because they can be extremely secure ways of registering ownership and making transactions. They are also efficient because they eliminate the need for intermediaries to clear and settle transactions. The most obvious example of how this represents progress lies in how blockchains improve on the current payments system. Currently, when you use a credit card to make a purchase, numerous intermediaries – such as credit card companies and banks – are involved, which ends up increasing the cost of every transaction by around three percent. (The cost added by intermediaries when transferring money internationally is significantly higher and can reach ten per cent of every transaction.) Moreover, many of these intermediaries have access to the personal information associated with the credit card. Payments made on the blockchain can effectively eliminate these transaction fees and occur without anyone gaining access to either counterparty's personal information.[20]

While payments are the most obvious application of the blockchain, a host of "blockchain 2.0" applications are already being developed and range from allowing individuals to own and profit from the data they generate online, to enabling secure "pseudonymous" online voting,[21] to creating dependable property registries for individuals in the developing world, to automated and self-executing "smart contracts." Given that regulators are already struggling with how to regulate cryptocurrencies such as Bitcoin, the tumult that blockchains will cause may be just beginning: "You think it's hard to figure out what Bitcoin is from a regulatory standpoint, well, now we're talking about figuring out what an autonomous corporation is... To them it's like something from *The Matrix*."[22]

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20 Vigna, P. and Casey, M. 2016. *The Age of Cryptocurrency: How Bitcoin and the Blockchain Are Challenging the Global Economic Order*. New York: Picador. pg. 99.

21 Similar to anonymity in that a pseudonymous individual's true identity is unknown, pseudonymity differs in that an individual's pseudonym is known. The degree of secrecy or privacy granted by pseudonymity can vary greatly depending on how difficult it is to link an individual's identity with their pseudonym.

22 Quoted in Vigna, P. and Casey, M. 2016. *The Age of Cryptocurrency*. pg. 241.

# Autonomous Vehicles

Looking to the future, ride-sourcing will continue to evolve and will likely merge with many similar modes of transportation such as car-sharing, ride-sharing and micro-transit.[23] For example, in a move that, if fully implemented, could effectively collapse ride-sourcing, car-sharing and ride-sharing – as well as traditional car rentals – into a single offering, ride-sourcing firm Uber has already started trialing its own self-driving cars in Pittsburgh and San Francisco.[24] For many governments the arrival of automated vehicles (AVs) will soon force them to confront a whole new regulatory test before they've even finished solving the puzzle posed by Uber's original controversial ride-sourcing offering – a familiar challenge for those attempting to regulate in environments of rapid technological change.

The Boston Consulting Group has estimated that the AV industry[25] could be worth as much as $77 billion by 2035.[26] AVs could enter our lives in a number of ways. They might arrive on demand in the form of "Mobility as a Service" (MaaS)[27] and be operated in fleets by a variety of large companies ranging from Uber to Ford, Car2Go or even Google. Some individuals might own their

own AVs which they would use themselves but then also rent out for a small profit via a P2P network to others through a car-sharing platform such as Turo.[28] More interestingly, AVs might even own themselves under some form of charitable designation made possible by blockchain-enabled smart contracts and be programmed to offer the best possible price for transporting low-income customers.[29]

The arrival of AVs will radically re-organize how we move around and have a multitude of ramifications. If governments and regulators aren't careful, some of these could be quite dire. For instance, AVs could easily increase congestion by inducing more vehicular travel;[30] generate negative health outcomes by reducing active transportation;[31] and encourage even greater urban sprawl by making commuting more tolerable.[32] Less speculatively, it seems clear that the arrival of AVs will mean that many of those employed as drivers will likely be automated out of a job.[33]

23  These terms all refer to use-cases for vehicles that are currently distinct. See Ditta, S. and Urban, M. with Johal, S. 2016. *Sharing the Road*. pages 6-12 for a discussion of these other forms of shared mobility.
24  Somerville, H. 14 September, 2016. "Uber debuts self-driving vehicles in landmark Pittsburgh trial." *Reuters*. http://www.reuters.com/article/us-uber-autonomous-idUSKCN11K12Y and DeBord, M. 15 December, 2016. "Uber did everything right in Pittsburgh with its self-driving cars – but is doing everything wrong in San Francisco." *Business Insider*. http://www.businessinsider.com/uber-doing-everything-wrong-in-san-francisco-self-driving-2016-12.
25  The term automated vehicles refers to a spectrum of vehicles with different levels of automation ranging from limited driving assistance features, such as cruise control, to complete automation. See Zon, N. and Ditta, S. 2015. *Robot, Take the Wheel: Public policy for automated vehicles*. The Mowat Centre. https://mowatcentre.ca/robot-take-the-wheel/.
26  Owram, K. 2 February, 2017. "Car wars: Why 'Canada is dead last' in the potentially huge self-driving industry." *The National Post*. http://business.financialpost.com/news/transportation/car-wars-canada-is-dead-last-in-the-potentially-huge-self-driving-industry.
27  UbiGo. 24 May, 2015. "UbiGo – Mobility as a Service in reality." *UbiGo*. http://www.ubigo.se/wp-content/uploads/2015/06/About_UbiGo_May2015.pdf and Thompson, C. 15 December, 2016. "Lyft co-founder says human drivers could soon be illegal in America." *Business Insider*. http://www.businessinsider.com/lyfts-john-zimmer-interview-2016-12.

28  Saltzman, A. 19 April, 2016. "Turo peer-to-peer car rentals expand Canada's sharing economy." *CBC*. http://www.cbc.ca/news/business/turo-car-rentals-sharing-economy-1.3541343.
29  Kelion, L. 16 February, 2015. "Could driverless cars own themselves?." *BBC*. http://www.bbc.com/news/technology-30998361 and The Economist. 8 January, 2015. "Much more than digital cash." *The Economist*. http://www.economist.com/news/business-books-quarterly/21638093-rise-and-fall-crypto-currency-good-news-authors-least-much.
30  Bierstedt, J. Gooze, A. Gray, C. Peterman, J. Raykin, L. Walters, J. January 2014. "Effects of Next Generation Vehicles on Travel Demand and Highway Capacity." *FP Think Working Group*. http://orfe.princeton.edu/~alaink/Papers/FP_NextGenVehicleWhitePaper012414.pdf. See pages 15-16.
31  McMahon, J. 29 September, 2015. "Autonomous Vehicles: Good For The Climate, Commute, Pocketbook, Bad For The Heart?". *Forbes*. http://www.forbes.com/sites/jeffmcmahon/2015/09/29/autonomous-vehicles-good-for-the-climate-commute-pocketbook-bad-for-the-heart/#7af8317841e9.
32  Ticoll, D. 15 October, 2015. *Driving Change: Automated Vehciles in Toronto. Munk School of Global Affairs*. https://www1.toronto.ca/City%20Of%20Toronto/Transportation%20Services/TS%20Publications/Reports/Driving%20Changes%20(Ticoll%202015).pdf. See page 35.
33  The Economist. 1 July, 2015. "From Horseless to Driverless." *The World If 2015*. http://worldif.economist.com/article/12123/horseless-driverless.

On the positive side, however, AVs offer a host of potentially transformative benefits. To name just a few, AVs could enable much cheaper transportation by:

» Eliminating one of the largest costs involved, namely paying a driver.[34]

» Allowing the cost and use of vehicles to be more easily shared thereby making private transportation more financially accessible.[35]

» Reducing transportation's environmental impact by increasing the intensity of a vehicle's usage.[36]

» Reducing injuries and fatalities due to vehicular accidents and, in so doing, reducing the costs of healthcare.[37]

» Freeing up time by reducing congestion and enabling drivers to do other things while commuting, potentially increasing quality of life and productivity.[38]

» Improving access to transportation for those who cannot drive.[39]

» Allowing more efficient use of infrastructure, freeing up government funds for other priorities.[40]

» Enabling more efficient use of land thereby freeing up swaths of valuable urban real estate by, for example, reducing the demand for parking.[41]

Which of these potential outcomes occur, and how they will interact, will depend greatly on the legal frameworks which ultimately regulate AVs and their use. For example, one critical feature of this framework will be the way in which liability for any accidents involving AVs is determined. Will a passenger be held responsible when they have no control over the AV beyond providing it with a destination? Will the owner be responsible when they have not been involved in the AV's software design? Is it more reasonable to hold the software designer liable or the company responsible for the moral choices encoded into the algorithm?[42] Or perhaps the government that approved the algorithm? Would such an approach block movement towards what is otherwise a potentially beneficial innovation overall? Determining the answers to these regulatory questions will take time and effort, but will profoundly shape the ways in which AVs are ultimately used.

34  The Economist. 1 July, 2015. "From Horseless to Driverless."
35  Moavenzadeh, J. 22 May, 2016. "How Driverless Cars Can Shrink America's Income Gap." *Fortune*. http://fortune.com/2016/05/22/driverless-cars-income-gap/.
36  Ticoll, D. 15 October, 2015. *Driving Change*. See page 35.
37  Urmson, C. 11 May, 2015. "The View from the Front Seat of the Google Self-Driving Car." *Backchannel*. https://medium.com/back-channel/the-view-from-the-front-seat-of-the-google-self-driving-car-46fc9f3e6088#.u3gmcqs63.
38  Adams, T. 13 September, 2015. "Self-driving Cars: from 2020 you will become a permanent backseat driver." *The Guardian*. http://www.theguardian.com/technology/2015/sep/13/self-driving-cars-bmw-google-2020-driving.
39  Zon and Ditta 2015. *Robot, Take the Wheel*. See page 11.
40  KPMG. 2015. *Automobile Insurance in the Era of Autonomous Vehicles*. 24th Annual Insurance Issues Conference. https://home.kpmg.com/content/dam/kpmg/pdf/2016/05/Autonomous-Vehicles.pdf. See slide 6.

41  Bilton, N. July 7, 2013. "Disruptions: How Driverless Cars Could Reshape Cities." *The New York Times*. http://bits.blogs.nytimes.com/2013/07/07/disruptions-how-driverless-cars-could-reshape-cities/.
42  For example, "crash optimization" will be one of the critical issue with which firms and governments will need to grapple when automated vehicles begin to carry passengers. Crash optimization refers to the choices that the algorithm controlling the self-driving car is programmed to make when it realizes that a crash is imminent. These choices include questions around whether the car should prioritize reducing the total number of individuals harmed or reducing the severity of the injuries that the crash does inflict. See Bliss, L. 28 December, 2016. "3 Bumps on the Road Ahead for Shared Autonomous Vehicles." *CITYLAB*. http://www.citylab.com/commute/2016/12/regulating-shared-autonomous-vehicles-on-city-streets/511544/.

# What Are the Challenges?

This section has highlighted some of the most important trends in innovation by exploring case studies drawn from the cutting edge of technological innovation. More importantly, it has also highlighted how these trends are posing new challenges for regulators. For example, how ought governments respond to foreign firms such as Netflix and Uber that use their popularity and their ability to access Canadian consumers online to sidestep Canadian regulation when they don't see compliance as in their interests? Similarly, how should governments and regulators protect workers' rights when the form of their employment doesn't fit well into any existing legal categories?

The full impact of many of these new developments is not yet understood and will continue to evolve — a reality that will require governments to be able to constantly adjust and adapt over time. Moreover, the challenges posed by these new developments will be further complicated by the fact that governments and regulators will often be unable to respond from first principles or with a clean slate. Structures, behaviours, techniques, and capabilities that have evolved over time within governments to manage earlier challenges — or in some cases simply by happenstance — can weigh policymakers and regulators down with cumbersome inheritances, making it difficult to pivot and confront these new challenges with agility.

The full impact of many of these new developments is not yet understood and will continue to evolve — a reality that will require governments to be able to constantly adjust and adapt over time.

In the next section, we draw on our research and interviews to identify several of the key challenges that governments and regulators will be forced to confront as they seek to regulate in the digital era. In so doing, we will illuminate the main obstacles, as well as opportunities, that they will confront, which we will discuss under three broad headings: (1) structure of government, (2) engagement of stakeholders, and (3) skills and competencies.

# 3 CHALLENGES AND OPPORTUNITIES FOR REGULATORS

Current approaches to developing regulation in Canada have evolved gradually over the past 150 years. During that time, governments and regulators have responded – mostly successfully – to successive waves of technological change. Each of these upheavals possessed their own specific characteristics, which have tested the ability of these institutions to balance protecting the public with the benefits of allowing innovation to proceed with a minimum of encumbrances. Governments and regulators face a similar test today but, given the increased pace with which these innovations are arriving, managing this latest wave may prove to be regulators' and policymakers' greatest challenge of this type to date.

Governments in Canada, as in many peer jurisdictions, have a preference for command and control regulatory approaches that often leave little discretion or judgement to the regulated community.[43] Strict, prescriptive requirements are well-suited to minimizing risk but pay little heed to compliance costs or to incentivizing innovative behaviour. Moreover, while the federal government and some provincial governments have moved towards more robust regulatory costing and stakeholder consultations in recent decades, the regulatory design process is still very much a government-centred exercise – a situation that owes much to the hierarchical structure of government.

Such an approach is understandable when it comes to many health and safety issues, where strict requirements around water safety or food quality, for example, are in the public interest. In these cases, offloading or sharing responsibility for outcomes and design with the regulated community could lead to significant harms. But, such approaches have also been adopted in other areas where the gravity of the issues involved is not as high. Furthermore, it is only recently that governments have begun to pay attention to the accumulation of rules over time, something that is becoming increasingly problematic in a context where many rules grow stale and are never revoked or amended to reflect new technological or social realities.

Another, and similarly challenging, structural feature of today's regulatory landscape is the absence of sufficient coordination between government regulators. Public sector culture and structure have led to a muddled map of discrete regulatory fiefs distributed between departments and agencies at the federal, provincial and

43 Hepburn, G. "Alternatives to traditional regulation." *OECD Report*. www.oecd.org/gov/regulatory-policy/42245468.pdf and Gunningham, N. May 2007. *Regulatory reform beyond command and control*. Amsterdam Conference on the Human Dimensions of Global Environmental Change. http://www.2007amsterdamconference.org/Downloads/AC2007_Gunningham.pdf.

municipal levels. Frequently, these entities are unable to coordinate their regulatory efforts or optimize their focus, a problem that is likely a function of mandates that are overly specific and which rarely target better inter-agency coordination as an explicit objective. In an increasingly interconnected policy landscape, however, issues such as how to integrate AVs into transportation systems will touch mandates across numerous agencies and at all three levels of government meaning that whole-of-government solutions and intergovernmental collaboration will become more necessary than ever.

Engaging stakeholders at the correct stage in the regulatory process is a challenge that has always bedevilled governments. Policymakers or regulators who engage with stakeholders too early risk appearing unprepared and having their plans scuppered by stakeholder opposition. Conversely, engaging too late can lead to regulations that don't reflect real world concerns and conditions and which will ultimately require time-consuming *post hoc* amendment. The optimal balance between these two extremes is an admittedly difficult one to strike.

Some standard requirements for engagement processes are already in place. Examples include the public posting of draft regulations in the *Canada Gazette* or other regulatory registries and engagement at the regulatory costing phase and through other consultative *fora*. Nonetheless, there is significant scope for closer and more collaborative engagement between regulators and stakeholders emphasizing more co-design and joint problem solving, stress testing of issues prior to finalization and ongoing real-time feedback aimed at informing amendments in a timely manner. Unfortunately, such collaboration is still more of an ideal than a common practice (though we do offer a number of successful examples in the next section).

Finally, being able to call on staff with the skills and competencies needed to regulate effectively in the digital age is a challenge that Canadian governments and regulators are increasingly confronting. For example, Ontario recently hired a Chief Digital Officer and has started a technology and innovation focused Digital Internship program aimed at helping to modernize how government interacts with its citizens.[44] Nonetheless, governments face real challenges in finding and retaining employees with the skills and competencies relevant to technological innovation. Moreover, the public sector is competing for these individuals with a Canadian private sector that is estimated to need over 200,000 more skilled information and communications technology (ICT) workers in the next three years alone – demand that likely cannot be met solely from domestic sources.[45]

Each of these three areas – structure of government, engagement processes, and skills and competencies – offer their own challenges for governments and regulators as they seek to navigate the consequences of technological innovation. Thankfully, however, they all also offer significant opportunities for governments and regulators to improve their processes as well as the results that they are able to offer Canadians.

44  Government of Ontario. 27 March, 2017. "Ontario Names First Chief Digital Officer". *News Release*. https://news.ontario.ca/maesd/en/2017/03/ontario-names-first-chief-digital-officer.html. For more information about the Ontario Digital Internship program see https://medium.com/ontariodigital/finding-new-digital-talent-ec601c4df682#.d8uw3slu4.
45  Sewani, K. 10 March, 2016. "Canada's First National Digital Talent Strategy Paves the Way Forward for an Innovative and Globally Competitive Economy." *Information and Communications Technology Council.* http://www.ictc-ctic.ca/canadas-first-national-digital-talent-strategy-paves-the-way-forward-for-an-innovative-and-globally-competitive-economy/ and Hemmadi, M. 7 June, 2017. "How Canada's immigration policy is failing high-tech startups." *Canadian Business.* http://www.canadianbusiness.com/innovation/how-canadas-immigration-policy-is-failing-high-tech-startups/.

# Structure of Government

## WHAT'S THE CHALLENGE?

Government's structure can make it difficult to create innovation-friendly regulation. At the political level, this problem stems partially from the simple fact that lawmakers and ministers have limited time and attention for any particular issue, given the scope of their responsibilities. With the growing demand for regulation in an increasingly complex society, that means that there will always be unmet demands for their attention. Moreover, since they are ultimately responsible for all decisions taken in their portfolio, ministers are reticent to delegate too much of their decision-making – especially in politically sensitive areas. Add in the fact that regulatory priorities often get influenced by external political factors,[46] and it quickly becomes clear why government can be slow to regulate. This has always been a problem, but in sectors such as technology where the pace of change is increasing rapidly, it is growing more problematic.

A similar pattern prevails in government bureaucracies. Hierarchical structures create many bottlenecks through which decisions must pass and at which they are often delayed. Bureaucracies can also be biased by incentive structures which discourage regulators from proactively assisting those being regulated in complying with the rules. Instead, regulators are encouraged by these structures to adopt risk-averse perspectives and strictly apply the letter of the law, often producing scenarios such as that described by one of our interviewees, in which a financial technology entrepreneur acquaintance "spends two-thirds of their time dealing with

regulation instead of innovating."

Naturally, some regulatory consistency is required. Investors and businesses need regulatory stability in order to justify and plan their investments. But, there is a difference between stability and rigidity, and regulatory rigidity has a cost. The example of Uber is instructive. As one interviewee pointed out, the manner of Uber's launch in Canada was driven by its recognition that lawmakers were unlikely to alter regulations and allow it to start operating, at least in a timely manner, if it played by the rules. Unwilling to risk losing its competitive advantage – and significant profits – through delay, Uber launched unilaterally and dared authorities to stop it.

Regardless of whether this was a laudable approach, this episode shows how regulatory frameworks that are perceived as unresponsive can be counter-productive and even motivate actors to try and circumvent them. Other firms, including Car2Go in Toronto, have followed Uber's lead and decided to launch operations or new offerings in advance of regulatory approval, in the hope that they can win over public opinion and put pressure on regulators to amend what they see as out-dated rules.[47]

## ARE THERE OPPORTUNITIES TO DO BETTER?

One interviewee tried to explain the difference between regulators and innovators by suggesting that "innovators get frustrated with regulation

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46  The renewal of the Copyright Act, which was twice delayed by the fall of a minority government, provides one particularly notorious example of this problem.

47  Smith Cross, J. 22 March, 2016. "Car2Go Toronto rolling out on-street parking despite City Hall rejection." *Metro.* http://www.metronews.ca/news/toronto/2016/03/22/car2go-to-introduce-on-street-parking-in-toronto-.html It is worth noting that Car2Go claims to have made a significant effort to obtain a "universal parking permit" similar to those it has obtained in the other jurisdictions where it operates before it launched its one-way car-sharing offering.

because they can't hack it like they can other problems." Indeed, differences between regulators and innovators seem to stem partially from their different perspectives and cultures. When asked if governments should be more willing to take on risk, our private sector interviewees unanimously said "yes." By contrast, those from the public sector were more likely to see current levels of risk-tolerance in government as about right. To a certain extent, this tension is probably positive and appropriate.

Nonetheless, our research revealed a number of important opportunities to reshape the structure of government and make it more conducive to innovation-friendly regulation. One opportunity lies in regulators moving beyond the simple application and enforcement of rules to adopting a greater focus on helping innovators comply with the rules. One interviewee described an instance in which an acquaintance's application to a regulator was rejected due to a clerical error. The error, which could have been easily corrected by a proactive phone call from the regulator to the applicant, resulted in the applicant having to reapply. This additional step created a costly six month delay for their business.

This is unfortunate, as regulators' aim, in most circumstances, should be to ensure that standards are met, not to test the regulated and fail them without assistance when they are found wanting. As Anna Cronin, Commissioner for Better Regulation from Australia's state of Victoria has put it "We are teachers not just markers".[48]

Other important sources of potential opportunities lie in improved leadership and management, better coordination across bureaucratic silos, and a flattening of hierarchies. While regulators are already able to engage

and consult with actors in other sectors, their narrowly-drawn mandates often result in decisions for which the ramifications for other sectors are not properly considered. Currently, there are too few mechanisms for coordination that cut across these silos and, as one interviewee pointed out "we can't use the PM's power every time we need to make Transport play nice with Agriculture." Better coordination would help, as would flatter hierarchies which would allow for greater input from frontline staff who are often the ones best-placed to identify potentially problematic unintended consequences.

Increasingly, regulators are attempting to achieve their policy objectives through non-regulatory means such as policy statements and informal discussions with stakeholders. The experience of Britain's Financial Services Authority (FSA) with applying "principles-based regulation" provides a rich example of such an attempt – albeit one in which the results were mixed. This initiative did provide the FSA with greater flexibility but it also raised questions around clarity, predictability, accountability and transparency.[49] Many of these concerns were echoed in our discussions of principles-based regulation with private sector informants. Nevertheless, many regulators are finding these more flexible approaches to be effective, often when employed in moderation or in hybrid systems that also include more traditional regulatory tools, as they enable them to react with greater speed and agility to new developments.[50]

48 Cronin, A. 26 April, 2017. "International Best Practices: Lessons and Achievements". *Smart Moves: Modern Ways to Regulate*. The Institute of Public Administration of Canada. Toronto.

49  Black, J. Hopper M. Band, C. May 2007. "Making a success of principles-based regulation." *Law and Financial Markets Review*. 191-206. http://www.lse.ac.uk/collections/law/projects/lfm/lfmr_13_blacketal_191to206.pdf.

50  One of our regulator interviewees cited Canada's Personal Information Protection and Electronic Documents Act (PIPEDA) as a good example of such a hybrid regulatory framework.

# Engagement with Stakeholders

## WHAT'S THE CHALLENGE?

Engaging with stakeholders through processes that are both broad enough to ensure quality regulation and public acceptance, and quick enough to be timely, is a critical part of crafting effective regulation. Recent growth in the pace and volume of innovation has increased the pressure on the mechanisms governments and regulators use to conduct stakeholder engagement. Similarly, advances in information and communication technology have reduced barriers for innovators from around the world to market their products to Canadians while simultaneously increasing the challenges for regulators to engage and regulate them. Technology has also enabled the engagement of ever larger numbers of stakeholders – many of whom are unfamiliar with or uninterested in the traditional assumptions which previously defined such exercises.

Many of the regulators we interviewed pointed to industry and other associations as their primary vector for engaging stakeholders. Some interviewees complained, however, that such entities were not very useful for engaging with innovators because many innovators work for or lead small- and medium-sized enterprises (SMEs) or start-ups. These smaller businesses are often not members of industry associations, lacked associations in their sectors, or do not have staff dedicated to engaging effectively with regulators.[51] Without such staff, engaging with regulators falls by default to the leadership groups for start-ups – individuals whose time is already overburdened by multiple competing priorities.

We also heard that many innovators perceive engaging with regulators, especially when they do not see such engagement as potentially yielding new funding, as a waste of their limited time.

A slightly different challenge results from the fact that many innovators are not affiliated with Canadian industry associations because they are headquartered in foreign jurisdictions. This lack of representation is problematic because it can result in the creation of regulations that do not take into account the perspectives and experiences of all the firms being regulated. Poorly conceived regulation can stifle innovation or create conflicts when firms respond by acting in ways that undermine approaches created by regulators they do not know, respect or trust. Netflix' conflicts with the CRTC offer a good illustration of the sorts of problems that can result from such a situation.[52]

Engagement with stakeholders is also hampered by the difficulties involved in staying up-to-date with the changes that are occurring at the technological cutting edge. We discuss the specific problems posed by insufficient in-house technical expertise among regulators in the next sub-section, but it is important to realize that these problems are not limited to governments. Many businesses and other organizations are also struggling to keep up. Insufficient expertise

51  Note, for instance, that Shopify – one of Canada's successful start-ups – only hired their first dedicated government relations employee in May 2016, 12 years after its founding and one year after an initial public offering raised $131 million (USD). Silcoff, S. 17 May, 2016. "Shopify hires first lobbyist as startups learn to navigate Ottawa." *The Globe and Mail.* http://www.theglobeandmail.com/news/politics/globe-politics-insider/shopify-hires-first-lobbyist-as-startups-learn-to-navigate-ottawa/article30059274/.

52  Brownell, C. 20 September, 2014. "It's the hottest drama on TV: The CRTC clashes with the online future." *The National Post.* http://business.financialpost.com/fp-tech-desk/its-the-hottest-drama-on-tv-the-crtc-clashes-with-the-online-future?__lsa=910a-e384 and Ibbitson, J. 25 September, 2014. "It's over CRTC. Netflix and globalization have won." *The Globe and Mail.* http://www.theglobeandmail.com/news/politics/its-over-crtc-netflix-and-globalization-have-won/article20784448/.

among stakeholders means that they are less able to present informed perspectives during engagement processes. This often means that regulations emerge without a proper understanding of their impact on certain groups' interests. It may also leave regulators vulnerable to capture by those few firms who do possess expertise. Limited stakeholder expertise was already a challenge for regulators in the context of the need to balance the interests of firms with those of often less well-resourced consumer, not-for-profit, and grassroots groups, but it has only been expanded by the rapidity of technological change.

## ARE THERE OPPORTUNITIES TO DO BETTER?

Many of the problems identified above can be at least partially solved by efforts aimed at improving the character and breadth of regulators' relationships with stakeholders. One important step in this direction is to reduce the episodic nature of the engagement undertaken by regulators, something that a number of our interviewees noted as problematic. Indeed, one regulator identified the cultivation of positive ongoing relationships with stakeholders – relationships in which stakeholders feel empowered to contact regulators of their own initiative and outside of specific review processes – as an important objective. This contrasted with many other public sector informants who felt that the level of direct ongoing engagement they conducted with their stakeholders was sufficient, but aligned with many of our private sector informants who suggested that this was not the case.

Much of this difference of opinion seems to stem from a belief among private sector actors that there is currently insufficient interaction between frontline regulatory staff members – those doing the day-to-day work of regulation – and

industry.[53] This argument holds that without this sort of ongoing interaction – which can take the form of site visits, informal consultations and attendance at the same conferences – frontline regulatory staff members do not have sufficient opportunities to build relationships with those they are regulating and develop a strong understanding of their perspectives. These relationships are important because they help regulators identify potential stumbling blocks, proactively guide innovators around them and ensure that the sorts of delays caused by minor errors in compliance – of the sort described earlier – do not occur. The benefits of these sorts of relationships are not limited to innovators as they can also enable regulators to ensure that those being regulated are meeting their formal obligations while also adhering to the spirit behind the rules.

Naturally, while closer relationships between government and industry potentially offer better outcomes, they also carry important risks. Of central concern is the possibility that the increased familiarity that such relationships produce would also reduce the critical separation between regulator and regulated as well as the neutrality that fair regulation of industry requires of regulators.

For instance, some worry that a closer relationship might lead to a "revolving door" between regulatory agencies and the very industries they are responsible for overseeing. The fear here is that individual regulators might be motivated to give the interests of those they are regulating greater consideration than would be optimal in the hopes of paving the way towards more remunerative future employment within that industry.

53 Both private and public sector informants seem to see the levels of engagement that currently exist at senior levels to be sufficient.

While such a situation would certainly be problematic, there are tools, such as strict cooling-off periods during which employees leaving a regulator are barred from working in the industry which they formerly regulated, which could be put in place to help address these concerns.

Critically, a lack of ongoing engagement between regulators and industry does not just result in missed opportunities; it can also have important negative consequences. One of our interviewees pointed out that many innovators run into problems because they make important decisions early on in their projects' development cycles that set them on the wrong regulatory track and then only realize their error after it is too late to easily change direction. By cultivating ongoing relationships, regulators can help innovators sidestep a host of easily avoidable regulatory problems, thereby increasing the chances they will succeed and create economic opportunities for Canadians.

In a related discussion, another informant claimed that because innovators see regulators as unresponsive, they tend to "self-censor" and limit the scope within which they imagine potential innovations by taking existing regulations as a given. This informant suggested that if regulators and innovators possessed better relationships, innovators would be more confident that regulations could be altered where reasonable, thereby expanding the potential scope of innovation and, by extension, increasing the potential benefit to the public.

Of course, it is only possible to improve engagement with innovators once they have been identified. As mentioned earlier, one important challenge for regulators is to make the initial connection with innovators who are not well represented by industry associations. To do this, regulators need to take a more proactive approach to engagement. For example, to compensate for poor representation of SMEs and start-ups by some associations, regulators need to use those structures that do exist, namely business incubators and accelerators, as substitutes.

Moreover, even if start-ups don't have the capacity to effectively engage government, it is in government's interest to identify and directly engage these innovators, even if it means putting in some extra effort and resources to cultivate these relationships. Some might object to this on the grounds of fairness (shouldn't both sides be working equally hard to solve this problem?) but in reality, ensuring high quality outcomes is the key issue at stake, not whether some sort of equitable distribution of outreach efforts has been achieved. Better engagement will yield better results and regulators should work to improve it regardless of what industry decides to do.

Taking a wider perspective, regulators can also collaborate with and leverage other parts of government more effectively. For example, if innovative companies are difficult to reach because they are headquartered in other jurisdictions, Global Affairs Canada's existing diplomatic networks – and even the secondment of staff to key missions around the world – offers a potential way to cultivate relationships by posting regulators in proximity to innovation hubs with a mission to engage these companies. Moreover, such inter-departmental or inter-agency cooperation can also help to foster an improved whole-of-government network better able to develop and implement the kinds of whole-of-government global strategies that are increasingly necessary for successful regulation.

# Skills and Competencies

## WHAT'S THE CHALLENGE?

Many of our interviewees suggested that one of the biggest problems with regulation is that regulators just don't understand the sectors they regulate very well. They argued that civil servants lack the technological expertise or the research capacity needed to fully understand the developments in their sectors or to act in a timely manner. Critically, it is important not to interpret this claim as a simple instance of knee-jerk anti-government complaining. As was mentioned in the previous section, industry faces similar challenges. In sectors on the technological cutting edge, where change is occurring at an even quicker pace, this problem is likely to become only more pronounced as new and even more difficult to understand technologies such as complex algorithms and blockchains gain wider implementation than is the case today.

This problem is compounded by the fact that the types of skills required by regulators have changed dramatically in the past 20 years. While some regulators acknowledged this in our interviews, many are having difficulty making the necessary skills upgrades to their personnel. Interestingly, some informants suggested that this is particularly a problem at the senior management level.

This observation aligns with a 2011 global survey that found that 29 per cent of public sector executives were worried that their organization "will not be able to keep up with technology change and will lose its competitive edge."[54] Public sector executives were the least likely of the eight categories of executives surveyed to be worried about their vulnerability to technological disruption, and were nine per cent less likely to be worried than the average. This result seems

## FIGURE 3
**Keeping Up With Disruption**

Percentage of respondents worried their organization "will not be able to keep up with technology change and will lose its competitive edge."
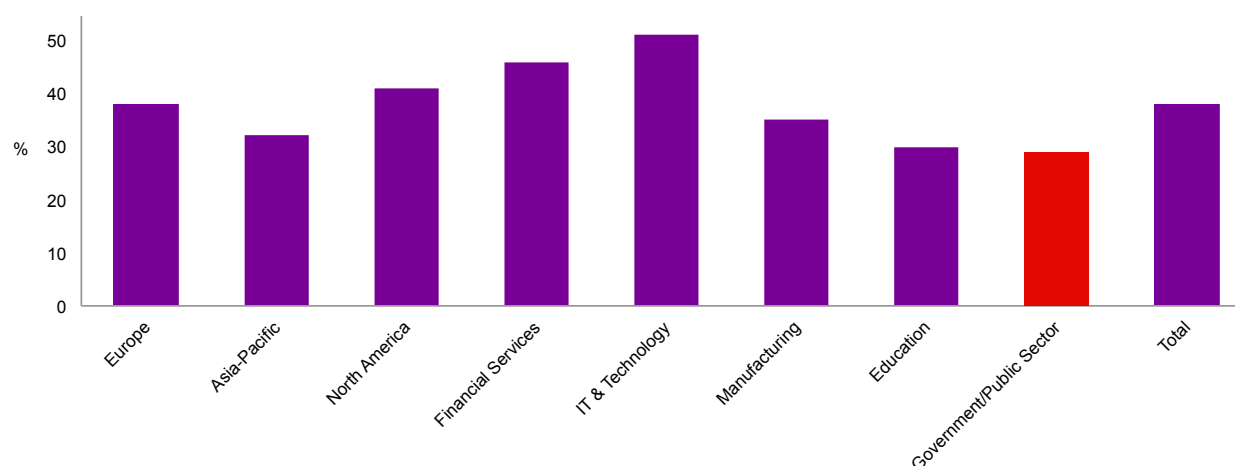


Source: Economist Intelligence Unit. 2011. *Frontiers of disruption: The next decade of technology in business.* Sponsored by Ricoh.

54 Economist Intelligence Unit. 2011. *Frontiers of disruption: The next decade of technology in business*. Sponsored by Ricoh. http://www.ricoh.be/fr/Images/Next%20Decade%20in%20Technology%20Exec%20Summary%20EN_t_60-58386.pdf. See page 3.

to indicate that public sector executives feel relatively insulated from disruption and possess less of a sense of urgency, a perspective which might explain their relatively slower response to the need for skills upgrades.

Many of the regulators we interviewed failed to find any major fault with the way that innovation is currently regulated, even in areas experiencing rapid technological change. This belief is itself a problem. Indeed, our private sector informants universally disagreed with the public sector interviewees' perspective on this matter. Often in the same breath, many private sector informants also complained that regulators possessed an insufficient understanding of how the private sector works. They argued that most civil servants lack experience in or with the private sector and that this can make it difficult to cooperate effectively with them. The opposite problem was identified by regulators, namely that private sector actors often fail to grasp that

their role was to advance the broader public good and not just the interests of industry. While not universally the case, our interviews with private sector actors did seem to confirm that this blind spot existed for some.

Finally, technological firms are increasingly suggesting that because they are increasingly able to generate and analyze enormous quantities of data, they may actually be better-positioned to ensure customer safety and other objectives than government.[55] Yet, recent high-profile incidents involving both technology firms and traditional operators clearly call the validity of such claims into question.[56]

Nevertheless, governments will, in a data-rich environment, likely need to consider yielding some traditionally public oversight responsibilities to these firms, albeit with appropriate transparency, audit and accountability systems. Regardless of whether a new technology is regulated by a firm with regulatory oversight or more directly by the regulator, however, a high level of in-house technical expertise will be required by regulators for regulation to be effective in the digital era.

> Even if start-ups don't have the capacity to effectively engage government, it is in government's interest to identify and directly engage these innovators, even if it means putting in some extra effort and resources to cultivate these relationships.

55  Markoff, J. 2 September, 2016. "The Artificial intelligence boom is raising questions about ethics and regulations." *The National Post*. http://business.financialpost.com/fp-tech-desk/the-artificial-intelligence-boom-is-raising-questions-about-ethics-and-regulations.
56  See, for example, Katz, M. 10 February, 2017. "A Lone Data Whiz is Fighting Airbnb — and Winning." *Backchannel*. https://backchannel.com/a-lone-data-whiz-is-fighting-airbnb-and-winning-7fd49513266e#.oudvnh5pi ; Isaac, M. 3 March, 2017. "How Uber Deceives the Authorities Worldwide." *The New York Times*. https://www.nytimes.com/2017/03/03/technology/uber-greyball-program-evade-authorities.html; Pittis, D. 23 September, 2015. "VW's personal betrayal a sad lesson in business morality: Don Pittis." *CBC*. http://www.cbc.ca/news/business/vw-tdi-diesel-morality-1.3238590.

# Standards-based Approaches to Governance

One of the greatest challenges facing regulators and governments as they seek to develop frameworks for regulating fast-moving technological industries is the length of time that legislative and regulatory processes can take. Difficulties in these areas are also often compounded by the challenges that governments face retaining employees with sufficient technical expertise to manage and renew these frameworks once they are put into place.

In some areas, this problem has been partially ameliorated by the adoption of standards-based approaches to governance. Standards are best understood as measureable, often technical, parameters associated with a particular product or service. Standards are usually voluntary, but can also become legally mandated if "referenced" in legislation.[57] Because standards are so useful for increasing efficiency, safety and other aspects of an industry in which all participants share an interest, even voluntary standards often achieve widespread adoption.

The strengths of standards as governance tools derive primarily from the processes by which they are developed and updated. Standards-developing organizations (SDOs), such as the Canadian Standards Association (CSA Group) or the International Organization for Standardization (ISO) develop standards by drawing on the expertise of thousands of area experts who work collaboratively within a highly organized network of committees to develop standards for their industries. While most participants are technical experts, the standards development processes operated by these SDOs also increasingly include representatives from stakeholder groups such as consumer advocates, environmental organizations, social and labour organizations, and intergovernmental organizations.[58]

57 For instance, the Ontario Building Code – which is legally a government regulation – includes references to many standards. These references occur in a number of contexts, but they usually identify a particular technical standard for a material or technique the use of which is required by the code. Such a mandatory reference means that builders are legally required to use materials or techniques that meet the referenced standard in order to be in compliance with the code. Failure to comply constitutes an offence under the Provincial Offences Act and can attract significant fines.

58 Mattli, W. and Buthe, T. October 2003. "Setting international standards: Technological rationality or primacy of power?." *World Politics 56*. See page 7; Webb, K. 2012. "ISO 26000: Bridging the public/private divide in transnational business governance interactions." *Comparative Research in Law and Political Economy Research Paper 21*.

## FIGURE 4
### The International Standards Development Process
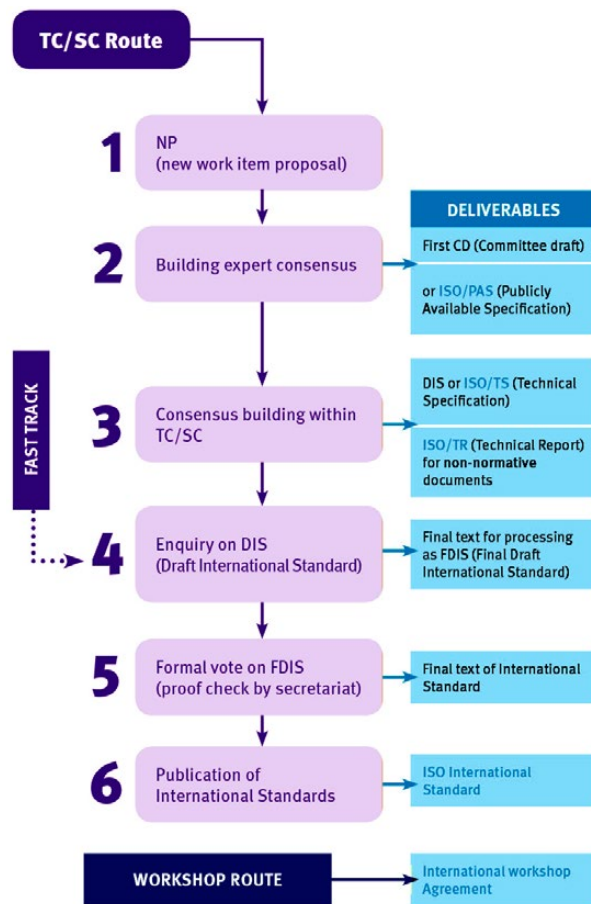


Source: International Organization for Standardization. "ISO Deliverables." http://www.iso.org/iso/home/standards_development/deliverables-all.htm.

Standards usually take between one and two years to develop. Because standards are developed by experts they are usually of a high technical quality. Because they are developed through a consensual process structured by strong professional norms and relatively isolated from partisan political conflicts they tend to be fairly well-balanced as well. Indeed, many laws and regulations have their genesis in standards that were so successful that governments simply translated them into regulation or legislation. A good example of this process can be observed in how CSA Group developed *CAN/CSA-Q830 model code for the protection of personal information*, a standard that includes a series of principles for privacy, including accountability, consent, accuracy and safeguards which went on to serve as the basis for Canada's Personal Information Protection and Electronic Documents Act (PIPEDA).[59]

Nevertheless, standards also have some drawbacks. Given that they require surrendering some measure of control, those parts of governments and regulators without previous experience of working with SDOs often do not possess sufficient trust to outsource rule-making in this way. Moreover, while usually quicker than comparable regulatory and legislative processes,[60] SDO-led processes are still viewed by some as insufficiently quick – a view held in many software development circles where narrower "consortia" or small groups of a few leading firms have emerged as the primary technical standard-setting entities in this industry's much more chaotic governance environment.

59 CSA Group. *CSA Group Privacy Statement*. Privacy. http://www.csagroup.org/legal/privacy/csa-group-privacy-statement/.
60 International Organization for Standardization. 2016. *My ISO job: What delegates and experts need to know*. International Organization for Standardization. http://www.iso.org/iso/my_iso_job.pdf. See page 27.

## ARE THERE OPPORTUNITIES TO DO BETTER?

Governments and regulators are recognizing the need for greater in-house digital and technological expertise. For example, the Government of Ontario has just hired its first Chief Digital Officer, a deputy minister-level position with a mandate to inject digital know-how into the government's operations for the purpose of improving service delivery and saving money.[61]

While certainly important, high-level appointments cannot by themselves increase the level of in-house expertise available to governments and regulators. Doing so also requires actions to increase the level and prevalence of expertise at all levels of the organization, an important realization that the federal government claims to have internalized.[62]

None of this is to say that these organizations are currently devoid of technical expertise. For instance, many regulators already have policy and/or research units that monitor emerging trends and regularly conduct environmental scanning exercises. Nonetheless, these units – and the larger organizations in which they are embedded – would benefit significantly from the injection of additional specialized subject matter expertise, especially in technical areas.

Encouragingly, numerous mechanisms already exist within the public service that can address challenges of insufficient expertise and experience. Secondments, educational leaves, and interchanges are all possibilities open to public servants. The success of these programs, however, currently seems to be limited by the fact that regulators, especially frontline staff, are not sufficiently incentivized to take advantage of these opportunities. To far too great an extent, work in the public sector is not seen as something that a worker can move in and out of over the course of a successful career. This situation is increasingly out of sync with careers in the rest of the labour market.

In addition to adding expertise, it is also important that in-house specialists be involved in engaging expertise outside of government in industry and in the academy. One of our interviewees pointed to the importance of cultivating extensive networks capable of keeping in-house experts plugged into information about new developments as they occur. Policy and research units also need to be better linked with each other across all parts and orders of government for much the same reason, but also so that regulators can better take advantage of opportunities for collaboration and to ensure that their work is not duplicative of, or in conflict with, the work of other agencies. Similarly, ongoing contact is critical to ensuring that different parts of government are not caught unawares or side-swiped by each other's decisions.

61  Government of Ontario. 27 March, 2017. "Ontario Names First Chief Digital Officer"; Benzie, R. 14 June, 2016. "Queen's Park to hire digital guru at cost of $200K annually." *The Toronto Star*. https://www.thestar.com/news/queenspark/2016/06/14/queens-park-to-hire-digital-guru-at-cost-of-200k-annually.html.
62  May, K. 18 November, 2016. "Government has learned tough lessons from Phoenix screwup, Brison tells public servants." *The Ottawa Citizen.* http://ottawacitizen.com/news/national/government-has-learned-tough-lessons-from-phoenix-screwup-brison-tells-public-servants.

Encouragingly, numerous mechanisms already exist within the public service that can address challenges of insufficient expertise and experience.

# 4 PROMISING APPROACHES

Canadian regulators and policymakers are not alone in facing these challenges. In fact, one of the most notable characteristics of the digital revolution is its global character. Companies that start in Silicon Valley are often operating in Europe and Asia within months. Consequently, it is worth exploring some of the approaches being tested in Canada as well as from other jurisdictions which may be instructive as we seek to update our approaches. In particular, four emerging trends from other jurisdictions stand out as noteworthy:

» Bringing design thinking into the regulatory process

» Reducing the regulatory burden

» Enhancing capacity within government

» Encouraging strong market competition

## Bringing Design Thinking into the Regulatory Process

Design thinking is a highly-touted approach being used in everything from creating consumer products to delivering government services more efficiently. The core of design thinking is a focus on defining a problem from the perspective of the end-user and deploying a specific set of methods and tools to rapidly prototype, pilot, and iterate potential solutions.[63]

Increasingly, policymakers are recognizing the importance of focusing on the end-user experience. One technique that they are using involves recruiting "citizens' reference panels," "juries" and "assemblies" to provide representatively-selected members of the public with an opportunity to deliberate on the difficult issues that communities are facing

and provide their recommendations on how governments should proceed.[64] Currently, these techniques are primarily used to inform policy, spending decisions and priority setting, but these techniques have also been used successfully to help design regulation.[65]

63  MaRS Solutions Lab, March 2016. *Shifting Perspectives: Redesigning Regulation for the Sharing Economy*. MaRS Solutions Lab. https://www.marsdd.com/wp-content/uploads/2016/04/MSL-Sharing-Economy-Public-Design-Report.pdf. See page 19.

64  See, for instance the Calgary Citizens Commission on Municipal Infrastructure http://calgary-commission.ca/ , and participatory budgeting in places like Paris: Plesse, R. 8 October, 2014. "Parisians have their say on city's first €20m 'participatory budget'." *The Guardian.* http://www.theguardian.com/cities/2014/oct/08/parisians-have-say-city-first-20m-participatory-budget.

65  Henderson, J. House, E. Coveney, J. Meyer, S. Ankeny, R. Ward, P. Calnan, M. 2013. "Evaluating the use of citizens' juries in food policy: a case study of food regulation." *BMC Public Health.* http://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-13-596. Additionally, the MaRS Solutions Lab, in partnership with the City of Toronto and the Government of Ontario, produced a report in which it co-created regulatory solutions to a number of challenges facing the sharing economy. See MaRS Solutions Lab, March 2016. *Shifting Perspectives*. See also Brand, J and Finn, M. February, 2009. "Informing our own choices: A proposal for user-generated classification." *Media International Australia* 130 112-126. Brand and Finn suggest a crowdsourcing mechanism for classifying media such as computer game or films for content and age-appropriateness.

Ontario's Condominium Act Review, which produced the Protecting Condominium Owners Act, passed in 2015, is a good example of how such techniques can be used successfully to help design a specific set of regulations.[66] This review featured a number of successful and innovative techniques, including the creation and support of a representative "residents' panel" to provide an informed voice for condominium residents where no organized stakeholder group previously existed to articulate this perspective. Recognizing the importance of this group to the success of the eventual regulation, this panel was given significant support and prominence in the consultation process.[67] Its main role was to help identify the problems that needed to be tackled – alongside several other more traditional consultation efforts – and then to review and respond to a set of recommendations designed to address these concerns a few months later.

The Toronto Planning Review Panel provides a similar, but even more innovative use of this approach. In this case, a representative panel of Toronto residents has been assembled not to review a specific project or proposal, but to enable ongoing consultations from an informed but otherwise representative group of citizens.[68] Again, recognizing that residents represent a key stakeholder group, but one that is unlikely to be as organized as others – and thus less likely to be able to advance its interest in a way that is commensurate with its importance – the city government is working proactively to ensure that it can access an informed perspective from this group.

Design thinking also emphasizes the importance of pilot projects, testing, and rapid iteration of solutions based on the evidence collected in these tests. This approach is well illustrated by California's iterative approach to the regulation of the use of automated vehicles (AVs) on public roads. California launched its first pilot program in September 2014. The pilot required companies to obtain a permit for testing and specified a comprehensive list of requirements they had to meet including the use of qualified test drivers, a specified level of insurance, and accident reporting requirements.[69]

The pilot was also accompanied by several rounds of consultations. Following the initial pilot, California used information gathered from the pilot to develop draft regulations which, if passed, would enable provisional deployment of autonomous vehicles under strict conditions, including ongoing reporting requirements around performance, safety, and usage of the vehicles and a requirement that vehicles be leased, not sold, to customers.[70] Additional consultations on, and potential revision of, the draft regulations would occur before they were enacted.[71] Many firms, including AV leaders such as Google and Tesla, have complained that the new regulations still require a licenced driver in the vehicle capable of taking control at any moment. But, in keeping with their iterative approach, the California Department of Motor Vehicles has stated that this requirement should not be viewed

66  For a review of the process, see Public Policy Forum. October 2014. *A Case Study of Ontario's Condominium Act Review*. Public Policy Forum. http://www.ppforum.ca/sites/default/files/Case_Study_EN.pdf.
67  Public Policy Forum. October 2014. A Case Study of Ontario's Condominium Act Review. See pages 8-9.
68  City of Toronto. "Toronto's Planning Review Panel." *Living in Toronto*. http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=865832ed6c89f410VgnVCM10000071d60f89RCRD. The plan is for the membership of the panel to be renewed on a biennial basis.

69  Glover, M. 21 May, 2014. "California DMV Adopts Autonomous Vehicle Testing Rules." *Government Technology*. http://www.govtech.com/transportation/California-DMV-Adopts-Autonomous-Vehicle-Testing-Rules.html.
70  California Department of Motor Vehicles. 16 December, 2015. *Summary of Draft Autonomous Vehicles Deployment Regulations*. https://www.dmv.ca.gov/portal/wcm/connect/dbcf0f21-4085-47a1-889f-3b8a64eaa1ff/AVRegulationsSummary.pdf?MOD=AJPERES.
71  Senate of the State of California. 19 October, 2016. *DMV Workshop on Autonomous Vehicles*. http://senate.ca.gov/vod/2016-10-19-DMV-Workshop-on-Autonomous-Vehicles . See especially California Secretary of Transportation Brian Kelly's remarks starting at 4:00 into the video.

as permanent, but as a temporary requirement that may be relaxed when the technology has been demonstrated to be sufficiently safe.[72]

Finally, focusing on the end-user experience also means working hard to ensure that it is as easy as possible for individuals touched by regulation to understand their obligations under it as well as the ways in which they can fulfill these obligations. This means avoiding legalese whenever possible and taking advantage of tools borrowed from initiatives such as plain language legislation/drafting to ensure that regulation speaks "directly, without the need for intermediaries, to the very people whose lives it affects."[73]

Such approaches should focus on engaging with the stakeholders who will be impacted by the regulation and learning from them how to ensure it is accessible to them. In a modern context, this approach should also include the use of techniques such as hyperlinking to referenced documents, explanations of obscure terms and the provision of concrete and detailed "worked" examples to improve the regulation's accessibility. It can also involve the use of multimedia tools such as flowcharts, tables and even links to audio/visual materials to make explanations as clear as possible to as wide an audience as is needed.[74]

# Building Capacity within Government

One of the views voiced most frequently in our interviews and consultations was that in order to ensure regulation is constructed in the optimal way, there needs to be greater capacity within government. More specifically, for regulation to be able to keep pace with technology and to encourage innovation, regulatory bodies need to increase the level of technological expertise they can call upon in-house.

One way that this expertise can be tapped is through programs that bring outside experts into government for time-limited appointments (e.g., fellowship and scholars-in-residence or executive-in-residence programs). During their fellowships, these individuals help to increase the knowledge level of their colleagues and can offer their perspectives on issues as they arise. The Government of Canada already has some programs of this type aimed at bringing such, often academic, expertise into the fold (the TD MacDonald Chair at the Competition Bureau and the Cadieux-Léger Fellowship at Global Affairs are two examples). But these programs pale in comparison to examples elsewhere such as the Presidential Innovation Fellows program in the United States. This highly competitive program pairs private sector technologists and innovators with civil servants for a 12 month period during which they work together to improve government products, services, and processes using user-centric approaches.[75]

72 Vekshin, A. 28 January, 2016. "Self-Driving Cars Would Need a Driver in California." *Bloomberg*. http://www.bloomberg.com/news/articles/2016-01-28/self-driving-cars-would-need-a-driver-under-california-rules.

73 Sullivan, R. 2001. "The Promise of Plain Language Drafting." *McGill Law Journal* 47 97-128. See page 101.

74 Sullivan, R. 2001. "The Promise of Plain Language Drafting." See page 103.

75 Gertner, J. 15 June, 2015. "Inside Obama's Stealth Startup." *Fast Company*. https://www.fastcompany.com/3046756/obama-and-his-geeks.

The Presidential Innovation Fellows are part of a larger network of technological capacity that was gradually assembled in the US federal government during the Obama Administration.[76] One of the reasons that this program has been successful is that it is designed around a flexible "tour of duty" concept. Recognizing that government would have difficulty recruiting and retaining this type of worker for permanent employment the program focuses instead on providing individuals with short time-limited opportunities to "give back to their country." While many of these individuals may not be willing to forgo the rewards and flexibility of the private sector for the entirety of their career, many are very happy to make a contribution to the public sector for shorter stints.

Moreover, while many Fellows return to the private sector after their "tour" is complete, some find that they actually prefer working in the public sector after all. This is where the second component of the US government's capacity-building program comes into play. If a Fellow completes their 12 month term and decides that they would like to continue working in the government, a program called 18F provides them with opportunities for continued employment on a project basis to help build a network of technological capacity and expertise throughout the federal government.[77]

A third component of this capacity-building initiative is the United States Digital Service (USDS – a service patterned on the British Government Digital Service or GDS). The task set for the USDS was to recruit and place "tech teams" ranging in size from five to 50 individuals in 25 government agencies by the end of Barack Obama's term as president.[78] Once in place,

these teams are meant to provide their agencies with cells of technological know-how capable of improving outcomes across the range of these agencies' activities.

# Reducing the Regulatory Burden

One of the messages we heard consistently from private sector interviewees was the need for regulatory processes to be streamlined. Time spent filling in forms or otherwise complying with regulation is time that companies are not spending innovating and creating value. We have already discussed how bringing a citizen-centric approach to regulation can improve its effectiveness. But doing so can also reduce the regulatory burden: in 2002, for example, the US Health and Human Services Department made a single regulatory change to how health insurance data was collected that saved US citizens 37 million hours of paperwork.[79]

Burden reductions such as this can translate into significant economic value: when the Netherlands reduced its regulatory burden by 23.9 per cent between 2004 and 2007, businesses in that country were estimated to have saved €3.92 billion, equal to about 0.85 per cent of Dutch GDP.[80] Similarly, by eliminating a requirement for truckers to file a report on the condition of their vehicles after every trip – even when no fault had been found – the US Department of Transportation is believed to have saved the trucking industry $1.7 billion in 2014.[81] Such improvements are especially valuable to small firms who are disproportionately impacted

76  Gertner, J. 15 June, 2015. "Inside Obama's Stealth Startup."
77  Gertner, J. 15 June, 2015. "Inside Obama's Stealth Startup."
78  Gertner, J. 15 June, 2015. "Inside Obama's Stealth Startup."

79  Hampton, P. March 2005. *Reducing administrative burdens: effective inspection and enforcement*. HM Treasury. See page 5.
80  Coletti, P. 2015. "Public Policy Design: How to Learn From Failures." *World Political Science*. 11(2) 325–345. See pages 333-334.
81  The Economist. 2 May, 2017. "Too much federal regulation has piled up in America." *The Economist*. http://www.economist.com/news/united-states/21717838-republicans-and-democrats-have-been-equally-culpable-adding-rulebook-too-much.

by regulatory burdens, an important problem considering it is these firms that are most likely to produce the innovations needed to power increases in productivity.

Estonia, a leader in the digitization of government services, is an extreme example of just how significantly regulatory burdens can be decreased through digitization and intelligent regulatory design. In Estonia, it is illegal for government to ask citizens for the same piece of information more than once, thereby saving citizens significant time in complying with regulation. This law has been enabled by Estonia's creation of a single unified online identity for each of its citizens which has in turn allowed government to deliver over 600 services to citizens and 2,400 services to business electronically. Even the country's cabinet has ceased using paper documents. In this context it is perhaps unsurprising that Estonia also boasts the highest number of start-ups per person in the world and punches well above its weight in global surveys of innovation.[82]

Estonia's digitization of government has been enabled by the fact that all of Estonia's government databases are compatible and linked to one another within an integrative framework called the X-road.[83] This system, the creation of which was begun in 2002, has helped to reduce regulatory burdens significantly. For instance, 95 percent of Estonians file their taxes online, a process that takes five minutes on average because most of the information is pre-populated;[84] refunds are paid in less than 48 hours; and it takes only a few minutes to set up

a company.[85] The system also allows citizens to access their health records, has enabled electronic voting and allowed digital signatures to replace physical ones as the preferred legal instrument of authorization.[86] The system is also designed to be robustly transparent with citizens able to see who in the government has viewed their data and take action if they feel that someone has accessed the system inappropriately.[87]

All of these efforts result in significant efficiency savings. In 2014, it was estimated that the productivity value of the X-road was equivalent to 3,225 people working 24 hours a day, seven days a week for the entire year. [88] In a country of only 1.3 million people, this is significant.

82  Schumpeter. 11 July, 2013. "Not only Skype." *The Economist*. http://www.economist.com/blogs/schumpeter/2013/07/estonias-technology-cluster.
83  The X-road has been so successful that Finland is now partnering with Estonia to extend it to Finland. For more information, see https://e-estonia.com/x-road-between-finland-and-estonia/.
84  The Economist. 31 July, 2013. "How did Estonia become a leader in technology?." *The Economist*. http://www.economist.com/blogs/economist-explains/2013/07/economist-explains-21.
85  The Economist. 28 June, 2014. "Estonia takes the plunge." *The Economist*. http://www.economist.com/news/international/21605923-national-identity-scheme-goes-global-estonia-takes-plunge.
86  Allison, I. 4 March, 2016. "Guardtime secures over a million Estonian healthcare records on the blockchain." *International Business Times*. http://www.ibtimes.co.uk/guardtime-secures-over-million-estonian-healthcare-records-blockchain-1547367 and Anthes, G. "Estonia: A Model for e-Government." *Communications of the Association for Computing Machinery* 58(6) 18-20. http://cacm.acm.org/magazines/2015/6/187320-estonia/fulltext.
87  Jaffe, E. 20 April, 2016. "How Estonia became a global model for e-government." *Sidewalk Talk*. https://medium.com/sidewalk-talk/how-estonia-became-a-global-model-for-e-government-c12e5002d818#.1yq4b8wxk. Though it should be noted that the system depends on a government issued electronic identity and identification card which cause some privacy advocates — primarily in English-speaking countries — a great deal of concern. See also Bershidsky, L. 4 March, 2015. "Envying Estonia's Digital Government." *Bloomberg*. https://www.bloomberg.com/view/articles/2015-03-04/envying-estonia-s-digital-government.
88  Vassil, K. 2016. "Estonian e-Government Ecosystem: Foundation, Applications, Outcomes." *Background Paper: World Development Report 2016*. http://pubdocs.worldbank.org/en/165711456838073531/WDR16-BP-Estonian-eGov-ecosystem-Vassil.pdf. See page 19. This is especially impressive given that the system is estimated to only cost €50-60 million a year to run and maintain. Bershidsky, L. 4 March, 2015. "Envying Estonia's Digital Government."

More to the point, however, is the fact that Estonia's approach to governance is designed to help enable innovation. Supportive infrastructure, such as the X-road, that reduces regulatory burdens is often cited as one of the reasons why Estonia produces so many start-ups and entrepreneurs.[89]

Regulation could also be made more efficient through improvements to inspection and enforcement. Inspections of various types represent a large proportion of the work carried out by regulators and these inspections consume significant government resources while also placing an important burden on the firms subject to these inspections.[90] By adopting a more "risk-based" approach to inspection, regulators can target their efforts at firms more likely to be in breach of regulations – based on past performance or the type of business they are engaged in – thereby increasing the impact of inspections, while also reducing the burden of inspection on low-risk firms.[91]

In Britain, such efforts enabled the Environment Agency to reduce its inspections by a third between 2002 and 2005.[92] Such an approach can also include providing benefits to firms that regularly pass inspections with rewards, such as inspection holidays, to further encourage

compliance.[93] Similarly, by collaborating with other regulators to synchronize or combine inspections from similar inspection regimes (i.e. Occupational Health and Safety, Fire Code, Building Code, etc) regulators can both optimize their own resources while reducing disruptions and burdens for businesses being inspected.

Advances in artificial intelligence will likely enable further significant advances in this regard. Already some governments are using a combination of "big data" and artificial intelligence to better target their inspection and enforcement activities. For example, the mayor's office in Boston has been able to increase the effectiveness of spot checks by its health inspectors (that is, inspections that find violations) by 25 per cent by using machine learning techniques to crunch publicly available user-generated Yelp reviews and identify the establishments most likely to be in violation of health and safety regulations.[94]

Of course, such advances pose new challenges; one algorithm used in Florida to help judges determine whether or not a defendant was likely to re-offend was accused of wrongly identifying black defendants to be twice as likely to re-offend as white defendants.[95] Algorithms and artificial intelligence will only be as good as their software and the data on which they are trained.[96] Nevertheless, when programmed and trained properly, these tools could simultaneously make regulators and governments more effective and efficient.

89  Jaffe, E. 20 April, 2016. "How Estonia became a global model for e-government." See also Rooney, B. 14 June, 2012. "The Many Reasons Estonia Is a Tech Start-Up Nation." *The Wall Street Journal*. http://blogs.wsj.com/tech-europe/2012/06/14/the-many-reasons-estonia-is-a-tech-start-up-nation/.
90  Hampton, P. March 2005. *Reducing administrative burdens*. See page 20.
91  Hampton, P. March 2005. *Reducing administrative burdens*. See page 29. The OECD recommends that enforcement be "risk-focused" and "proportionate to risk" in its description of enforcement best practices. OECD. 2014. "Regulatory Enforcement and Inspections." *OECD Best Practises Principles for Regulatory Policy*. OECD Publishing. http://www.keepeek.com/Digital-Asset-Management/oecd/governance/regulatory-enforcement-and-inspections_9789264208117-en#page15 . See page 14.
92  Hampton, P. March 2005. *Reducing administrative burdens*. See page 4.

93  Hampton, P. March 2005. *Reducing administrative burdens*. See page 32.
94  The Economist. 18 August, 2016. "The power of learning." *The Economist*. http://www.economist.com/news/leaders/21705318-clever-computers-could-transform-government-power-learning .
95  The Economist. 20 August, 2016. "Of prediction and policy." *The Economist*. http://www.economist.com/news/finance-and-economics/21705329-governments-have-much-gain-applying-algorithms-public-policy.
96  Buolamwini, J. November, 2016. "How I'm fighting bias in algorithms." *TEDxBeaconStreet*. https://www.ted.com/talks/joy_buolamwini_how_i_m_fighting_bias_in_algorithms#t-186803 ; begin watching at 3:18 into the video.

# Network Effects – Challenges and Opportunities

One of the most interesting challenges that the digital revolution has created for regulators is the question of how to regulate online platforms. For a variety of reasons, including the massive and rapid growth enabled by digitization, it has become possible for firms to create platforms that can capture significant market share virtually overnight. When combined with features which help these companies defend this market share more effectively, the advantage of being the "first mover" has grown accordingly.

"Network effects" are one such feature which helps companies build commitment to their services among their customers. The term refers "to the effect that one user of a good or service has on the value of that product to other users".[97] Network effects present a puzzle for regulators because they can be both beneficial to consumers – as they can increase the usefulness of a platform or service – and potentially harmful – as they can make it more difficult for new offerings to attract customers already committed to a network. Negative network effects have received the most attention with some alleging that, for a variety of reasons, they result in new entrants finding it difficult to penetrate markets in which there are already established players.[98]

Some argue that concerns in this area are overstated, arguing that even if negative network effects do provide established services with some advantages, other characteristics of the digital marketplace provide a countervailing push in the other direction. They suggest, for example, that the unique interconnectedness of the Internet enables new firms and large firms previously only active in other markets to quickly, and relatively cheaply, enter new markets and compete effectively with firms that are already well-established there. The introduction and rapid rise of Google's Chrome and Android in the hotly contested browser and mobile operating system markets respectively are two such examples. Indeed, the fact that digitization enables new firms to build market share very rapidly also means that superior offerings, when they emerge, can also quickly capture other firms' market share with the result that vulnerable incumbents can now be laid low before they have time to react. Arguably, the travails of firms such as Blackberry and Yahoo! illustrate this point.

Nevertheless, negative network effects remain a concern for their competition inhibiting potential and, by association, for potentially preventing the emergence of new innovations. This trend could exacerbate ongoing issues in Canada, where business dynamism seems to be falling – including the rate at which new businesses and "start-ups" are appearing. This is problematic as business dynamism is strongly associated with the introduction of innovations and new ideas, the things that drive increases in productivity and, ultimately, prosperity.[99] While new approaches, such as individual ownership of data created online and mandated data portability, as well as greater choice in online identity verification,[100] are emerging as potential solutions, so far, regulators and policymakers have not yet settled on how to respond appropriately.

97 House of Lords, 2016. *Online Platforms and the Digital Single Market*. See page 24.
98 Free Exchange. 24 May, 2016. "Regulating the digital economy". *The Economist*. https://www.economist.com/blogs/freeexchange Begin listening at 0:22 into the recording.
99 Tapp, S. 29 October, 2015. "The "start-up slow-down": Why is the Canadian economy losing its dynamism?." *Policy Options*. http://policyoptions.irpp.org/2015/10/29/the-start-up-slow-down-why-is-the-canadian-economy-losing-its-dynamism/ Canada is not the only place this is happening: Surowiecki, J. 15 June, 2016. "Why Startups Are Struggling." *MIT Technology Review*. https://www.technologyreview.com/s/601497/why-startups-are-struggling.
100 The Economist. 17 September, 2016. "A giant problem." *The Economist*. http://www.economist.com/news/leaders/21707210-rise-corporate-colossus-threatens-both-competition-and-legitimacy-business.

# Encouraging Strong Market Competition

One of the critical functions of regulation is to ensure a level playing field for all participants in the market and a healthy level of competition. Indeed, competitive environments are one of the greatest drivers of innovation.[101] Some of the most important spurs to competition in recent history were the result of government action, such as the breaking-up of AT&T and its telecommunications monopoly by the US government in the 1970s.[102] More recently and in Canada, the previous Conservative federal government dedicated significant effort to trying to facilitate the emergence of a fourth national wireless provider in order to reduce oligopolistic coordinated activity in this sector.[103] This effort, which was costly and controversial, was pursued at least partially as a means of encouraging

increased innovation in Canada.[104] As the digital marketplace continues to grow in size and importance, the question of how to respond optimally to the emergence of digital monopolies and other anti-competitive developments will remain an important one for regulators.[105]

While true monopolies are rare, similar obstacles to competition are common and often emerge from "regulatory capture." Regulatory capture refers to a phenomenon that arises when regulatory authorities mandated to regulate a particular industry or sector in the public interest instead come to serve the interests of those being regulated. Regulatory capture of city licencing departments by taxis – and the resulting lack of competition, innovation, and attendant poor service – has been

## FIGURE 5
**Changes in Market Share: Web Browsers**
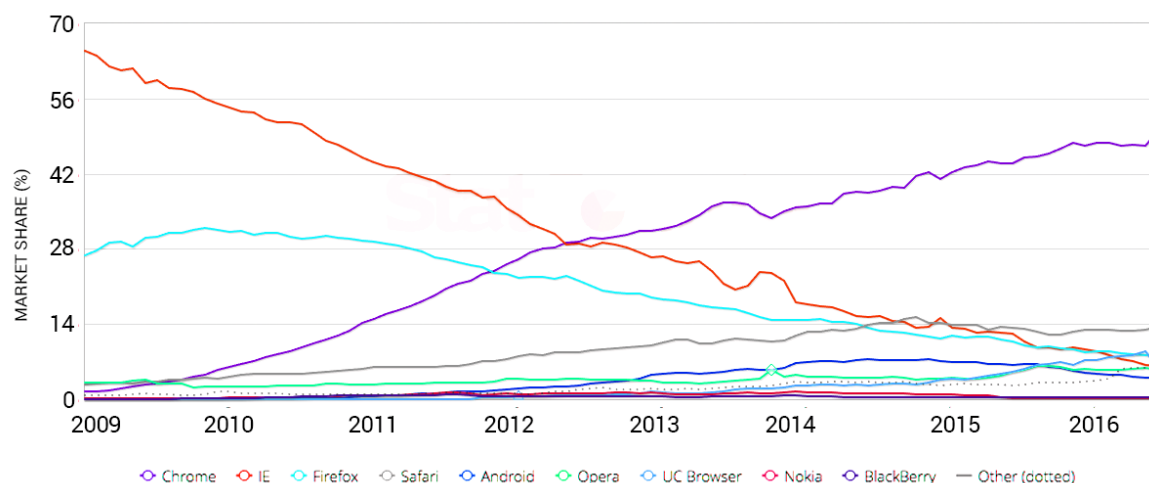


Source: StatCounter. GlobalStats. *Top 9 Browsers*. http://gs.statcounter.com/#all-browser-ww-monthly-200812-201606.

101 Business.view, 2 June, 2009. "Innovation through regulation." *The Economist*. http://www.economist.com/node/13766329.
102  Datta, A. January, 2003. "Divestiture and Its Implications for Innovation and Productivity Growth in U. S. Telecommunications". *Southern Economic Journal* 69(3) 644-658; Gort, M and Sung, N. October 1999. "Competition and Productivity Growth: The Case of the U.S. Telephone Industry". *Economic Inquiry* 37(4) 678-691.
103 Geist, M. 7 November, 2014. "Why Canada needs a fourth wireless player". *The Toronto Star*. https://www.thestar.com/business/2014/11/07/why_canada_needs_a_fourth_wireless_player.html.

104  Geist, M. 20 February, 2017. "If Ottawa is serious about innovation, it needs to fix the mobile market." *The Globe and Mail*. http://www.theglobeandmail.com/report-on-business/rob-commentary/if-ottawa-is-serious-about-innovation-it-needs-to-fix-the-mobile-market/article34092510/.
105  Schumpter. 2 May, 2015. "Shredding the law." *The Economist*. http://www.economist.com/news/business/21650142-striking-number-innovative-companies-have-business-models-flout-law-shredding.

alleged to have both contributed to the explosive popularity of ride-sourcing firms such as Uber and to have motivated Uber's aggressive approach to regulation.[106]

Significantly, regulatory capture need not be intentional or malicious; it can also occur in an abstract and unconscious way. In this case, regulators are not captured by a particular firm or special interest, but instead become so invested in the existing system and ways of doing things that they resist innovative approaches out of a desire to defend the world they know and avoid the uncertainties and challenges presented by the world they do not.

While some firms, such as Uber, have the resources to counter the lobbying power of incumbents – and even engage in litigation with governments and regulators – most innovators do not, with the result that many promising innovations simply never get off the ground. Industry is already taking some action in this area having recently created the Canadian Council of Innovators, which lobbies government on behalf of innovative technology firms. Another proposed solution to this problem is the creation of an Innovator's Defence Fund which would help pay the legal expenses of firms seeking to overcome unfair regulatory constraints on their businesses.[107]

Another potential solution to regulatory capture lies in mechanisms which open the regulatory process up to public scrutiny and participation. The "Peer to Patent" program, in which members of the public were asked to help provide information that would be used to assess patent applications, provides one example.[108] The project has been piloted in a number of countries including the USA, the UK, Australia, Japan, and Korea.[109]

The Government of Ontario's "Red Tape Challenge" – an initiative that invites businesses and the public to identify out of date, redundant or unnecessarily costly government regulation for repeal or reform without reducing the public interest – is also designed to heighten transparency and engagement.[110] Ontario's program is based on a similar project introduced in the UK in 2010.[111] Programs such as these can be further optimized by pairing them with an outreach and education program to help provide the public with the tools they will need to make the best use of such projects as well as to build engagement between the public and regulators.

106  Farren, M. 11 August, 2015. "Ending the Uber Wars: How to Solve a Special Interest Nightmare". *The Fiscal Times*. http://www.thefiscaltimes.com/2015/08/11/Ending-Uber-Wars-How-Solve-Special-Interest-Nightmare.
107  Hagemann, R. 16 March, 2016. "A Regulatory Framework for Emerging Technologies." *1776*. http://www.1776.vc/insights/regulation-emerging-technology-government-drones-hyperloop/?utm_campaign=PostBeyond&utm_medium=%235435&utm_source=Twitter&utm_term=A+Regulatory+Framework+for+Emerging+Technologies. Such a fund could even be conceived of as analogous to the Canadian Court Challenges program set up to advance language and equality rights. For more information on the Court Challenges program see Leblanc, D. 7 February, 2017. "Liberals revive funding for groups that take government to court." *The Globe and Mail*. http://www.theglobeandmail.com/news/politics/liberals-restore-and-expand-court-challenges-program/article33924559/.

108  See http://www.peertopatent.org/ for more information.
109  Hall, K. 13 June, 2011. "IPO's Peer to Patent site gets 100 reviewers to assess computing patent applications." *ComputerWeekly.com*. http://www.computerweekly.com/news/2240104743/IPOs-Peer-to-Patent-site-gets-100-reviewers-to-assess-computing-patent-applications.
110  See https://www.ontario.ca/page/red-tape-challenge and https://news.ontario.ca/medt/en/2016/03/support-for-the-red-tape-challenge.html for more information.
111  DCN News Service. 1 April, 2016. "Ontario launches Red Tape Challenge." *Daily Commercial News*. http://dailycommercialnews.com/Government/News/2016/4/Ontario-launches-Red-Tape-Challenge-1014650W/.

Ultimately, Canadian governments will likely find themselves facing more and more situations where their ability to regulate unilaterally is hindered by the global scope of those they are regulating.

# 5 A PATH FORWARD

What then should governments do to keep pace with the digital technologies that are reshaping so many industries? In a landscape of fast-moving, aggressive competition in which firms are seeking to quickly establish and expand beachheads in new marketplaces, regulators need to re-think existing approaches. There are three main areas that require attention: skills, structures and strategies.

## Skills

Regulators' knowledge of the fields they are regulating must remain current in order for them to be effective. Traditionally, this has meant regular training updates and desk-study on relevant topics. In a digital world, where today's knowledge-base might be out of date within six months, the imperative for real-time, rapid training that is frequently renewed is more important than ever.

» **Governments must invest in attracting, retaining and training** top-quality staff for key regulatory departments and agencies.

» **Greater emphasis should be placed on lifelong learning** for regulatory staff, including greater incentives and support for educational leaves – particularly for frontline staff.

» **The potential for new tools – such as the "microcredentials" and "nanodegrees"[112]** that online educational providers are now offering – to enable more targeted and cost-effective training for workers that is less disruptive to daily operations should be explored.

To the extent possible, regulators should also explore secondment opportunities for their staff to private sector firms, not-for-profit institutions and government research and development agencies to facilitate knowledge transfer and understanding of looming challenges and emerging trends. Such opportunities can also help build the improved relationships with private sector actors that regulators increasingly need. Similar programs have long been in place in reverse in the legal community, wherein private sector lawyers are seconded to securities regulators.

» **Explore opportunities for strategic, structured, short-term secondments** and assignments to digital technology firms and research and development labs (and vice versa) to give public and private sector workers improved understandings of how each other's organizations operate.

» **Incentivize secondments and other similar assignments** by making them an important consideration in performance appraisals and internal competitions for advancement.

112  The Economist. 14 January, 2017. "Equipping people to stay ahead of technological change." *The Economist*. http://www.economist.com/news/leaders/21714341-it-easy-say-people-need-keep-learning-throughout-their-careers-practicalities.

» **Renew commitments to hire and train data specialists** within government who will be able to understand and challenge regulated, expert actors who are operating in data-rich environments.

While committing to hiring more workers who are technologically adept and to upgrading the skills of existing employees are both important steps for governments and regulators to take, as was discussed earlier, doing so successfully may require governments to also focus on expanding the pool of technologically-skilled workers available across the economy. Steps taken in this direction would help to ensure that technologically-skilled workers are available for government to hire, and would also have the additional benefit of ensuring a deep talent pool exists to support the emergence and growth of innovative private firms.

» **Target educational outcomes in priority areas,** such as numeracy,[113] critical to the careers in science, technology, engineering and mathematics that drive technological innovation.

» **Improve the quality and accessibility of re-training programs** for individuals looking to or in need of upgrading their skills.[114] Programs such as Denmark's "flexicurity" system, Britain's UnionLearn and Singapore's SkillsFuture should serve as models for further exploration.[115]

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113 Moffat, M. and Rasmussen, H. February 2017. "Ten Big Ideas to Drive Innovation" in *Towards an Inclusive Innovative Canada; Volume 1.* Canada 2020. pp. 104-163. http://canada2020.ca/wp-content/uploads/2017/02/020317-EN-FULL-FINAL.pdf . See pages 140-144.
114 For instance, active labour market programs should not be restricted to only insured unemployed workers. See Morden, M. August, 2016. Back to Work: Modernizing Canada's labour market partnership. *The Mowat Centre.* https://mowatcentre.ca/wp-content/uploads/publications/123_back_to_work.pdf pages 23-26.
115 The Economist. 12 January, 2017. "Retraining low-skilled workers." *The Economist.* http://www.economist.com/news/special-report/21714175-systems-continuous-reskilling-threaten-buttress-inequality-retraining-low-skilled.

» **Make employment insurance rules more flexible** and supportive of re-training or pursuing further education for workers. This could include relaxing the restrictions on pursuing additional education in a specific set of "in-demand" trades and areas while on employment insurance.

# Structures

Given the often insular nature of government policy and regulatory development processes (i.e. typically behind closed doors at the cabinet table), we propose a more radical structural change to ensure that innovation is a key consideration at those discussions. As part of the Innovation Canada platform announced in its 2017 budget, the federal government should create an Innovation Advocate mandated to challenge regulators, publicly report on opportunities for innovation in regulatory and policy design, identify regulatory capture and unreasonably protected markets and other similar issues. The Innovation Advocate should be a deputy minister-level appointment with a direct reporting relationship to the Clerk of the Privy Council (an Officer of Parliament could provide even more independence). Provincial governments should also consider a similar role within their organizations.

» **Create an Innovation Advocate** to challenge established thinking in the regulatory space and identify opportunities for innovation.

Governments should also continue and expand existing efforts to enhance pathways for information sharing between regulators at the federal, provincial and municipal levels. A focus on formal policy development and coordination fora that tackle cross-jurisdictional issues with political leadership, as well as time-limited problem-focused "tiger teams" of regulators who are brought together to tackle specific thorny

issues on short- to medium-term assignments, would mitigate some of the risks of developing inconsistent and varied approaches in silos.[116] More information sharing and secondments with international peers could also be a strong benefit to Canadian regulators looking to both learn from, and share knowledge with, other best-practice jurisdictions.

» **Expand formal pathways between regulators** at all levels of government to enhance coordinated and collaborative solutions to cross-jurisdictional challenges.

Uniform commercial codes, such as the Personal Property Security Act, have significantly enhanced the ability of provinces in Canada to adopt shared approaches on commercial law transactions. A similar approach should be adopted for digital economy challenges posed by companies such as Airbnb and Uber which have, to date, prompted discrete, time-consuming and possibly redundant responses from many different provinces and municipalities. Given that municipalities have been the order of government under the most pressure from these new services — while simultaneously possessing the least policy capacity — such a collaborative approach offers a significant opportunity for improvement on the status quo.

Priority should be given to policy development and coordination processes involving all three levels of government. These processes should explore best-practice solutions and draft model legislation or by-laws that can be adopted by many jurisdictions, with minimal amendments to reflect local realities.

» **Create a Federal-Provincial-Municipal forum** to develop harmonized responses to technological innovations. This forum should serve as the focal point for a broader system of engagement, coordination and support for this effort.

» **Work with national and international standards development** organizations to identify, where appropriate, alternative governance instruments to legislation and regulation capable of responding more quickly and dynamically to rapidly changing technological innovations.

One of the most important impacts of digitization is the way that it reduces barriers for online services such as video streaming and ride-sourcing. Firms offering these services are operating in a marketplace where the costs of scaling to serve a global market are lower than they have ever been before. Because of this, many of these innovative firms have set their sights on the global market — and built their business models accordingly.

In this context, Canada represents a fairly small market. Thus, compliance with Canadian regulatory frameworks may not represent a high priority for these firms. As was discussed in the video streaming and ride-sourcing cases, some firms may respond to regulations they don't like by simply ignoring Canadian authorities. In other cases, as many Amazon.ca shoppers may have realized when comparing the site's inventory with Amazon.com, some firms may simply avoid regulatory problems by not offering certain services or products in Canada. Ultimately, Canadian regulators — federal, provincial, and municipal — will likely find themselves facing more and more situations where their ability to regulate unilaterally is hindered by the global scope of those they are regulating — as well as the popularity of the services these firms are offering.

116 For an in-depth discussion of approaches that make use of these sorts of teams, see Sparrow, M. 2008. *The Character of Harms: Operational Challenges in Control*. Cambridge: Cambridge University Press.

» **The federal government should take the lead** in convening Canadian regulators and policymakers in support of proactive engagement at the international level to ensure that international governance of global commerce aligns with Canadian government priorities as closely as possible.

» **The federal government should continue to pursue regulatory harmonization** as a priority in its multilateral and bilateral trade negotiations and as part of its ongoing diplomatic activities.

» **Canadian governments should always investigate** whether the adoption of existing international standards or regulatory instruments would serve their purposes before creating new national or sub-national ones.

» **Canadian governments should ensure that international considerations and issues are emphasized** in the training and recruitment of regulatory staff, to ensure that Canadian perspectives are informed by the increasingly global nature of regulatory issues.
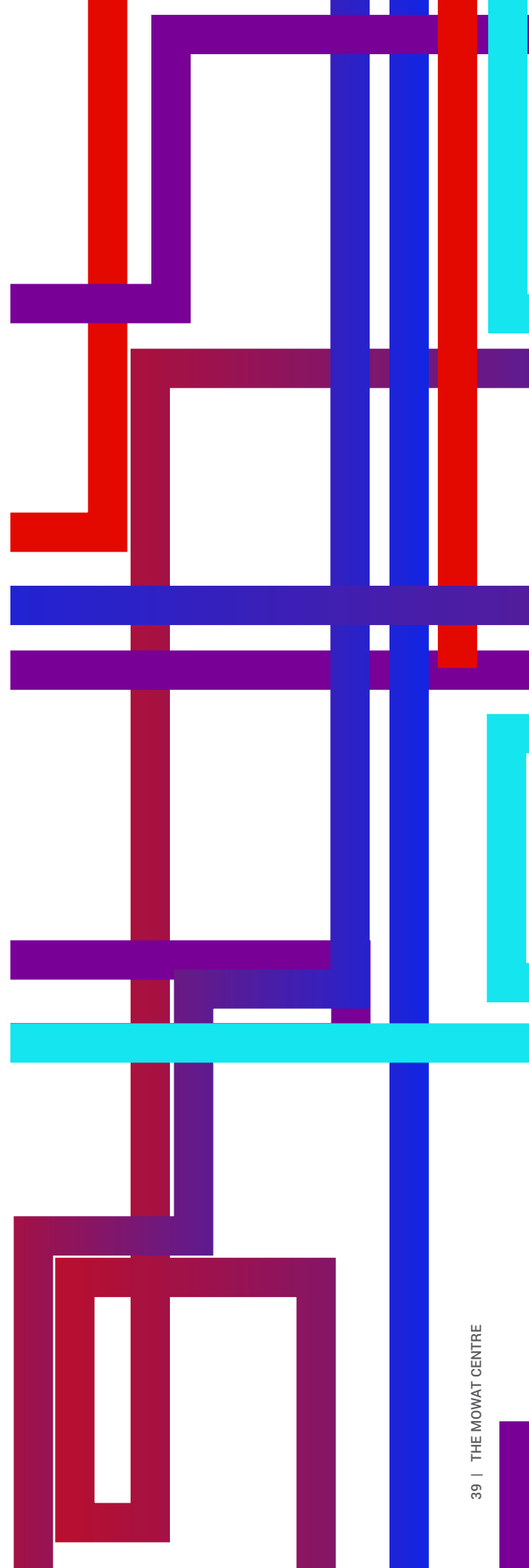
# Strategies

In business "what gets measured is what gets done." A key starting point for governments across Canada is to gain a baseline understanding of where regulatory frameworks currently stand. What burdens do they impose? Which regulations and laws should be updated to reflect the new digital economy and society in which we live? Can we create more inter-operable databases and systems within and between governments to share information and enhance regulatory outcomes?

An ongoing performance tracking report submitted regularly to cabinet, or the head of government, should also be prioritized to ensure focus on regulatory improvements does not waver. Once such a system is set up, politicians should take the plunge and commit to reducing regulatory burdens by a specified amount over a specified period of time. Other measures related to the quality of consultations, development of regulations and ongoing inspection and oversight should also be considered.

**Which regulations and laws should be updated to reflect the new digital economy and society in which we live? Can we create more inter-operable databases and systems within and between governments to share information and enhance regulatory outcomes?**

» **Governments across Canada should conduct a baseline assessment** of their regulatory frameworks and the burdens they impose.[117] Governments undertaking such an assessment should employ a standardized and transparent methodology for calculating the cost of these burdens.[118]

» **When this baseline assessment is complete, governments should set targets and timelines** for burden reduction. Particular emphasis should be placed on re-writing or abolishing rules and regulations in ways that reflect the emergence of the digital economy and society.

» **Periodic reports to legislatures, cabinets or heads of government** on the status of these regulatory updates and reviews should be developed and implemented.

Often, different regulators require the same information from businesses. By working collaboratively and coordinating their actions, regulators should be able to make their interactions with citizens and businesses

117  Such a system could also follow the US model of including both the financial costs and benefits for regulations to give a more complete picture. For instance, see Office of Information and Regulatory Affairs. 2016. *2016 Draft Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act*. Office of Management and Budget. https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/legislative_reports/draft_2016_cost_benefit_report_12_14_2016_2.pdf. Unfortunately, the methodology for calculating benefits is not as developed as it is for costs.
118  The Standard Cost Methodology (SCM) pioneered by the Dutch government and adopted by many others could serve as a model. See OECD. 2009. "Better Regulation in the Netherlands." *Better Regulation in Europe*. OECD and the European Commission. https://www.oecd.org/netherlands/43307757.pdf page 12. When first deployed in the Netherlands, the SCM enabled the Dutch government to cut an estimated 23.9 per cent of the regulatory burden which saved businesses an estimated €3.92 billion, equal to about 0.85 per cent of Dutch GDP. See Coletti, P. 2015. "Public Policy Design." pages 333-334. Other analysis suggests that a 25 per cent cut to the administrative burden faced by firms in the European Union could generate a 1.7 per cent increase in GDP. See Tang, P. and Verweij, G. 25 August, 2004. "Reducing the administrative burden in the European Union," *CPB Memorandum*. http://www.cpb.nl/sites/default/files/publicaties/download/memo93.pdf page 4.

less burdensome. Similarly, technology is now enabling new ways of ensuring minimum quality in some industries that could drastically reduce the regulatory burden on some businesses if new quality control and safety assurance systems were devised.

» **Following the example set by Estonia, governments should set a date**, through legislation, by which governments are required to only ask citizens and firms for a piece of information once. Using this date as a deadline, governments should build a plan for putting in place the necessary legislative reforms and building the necessary technological and administrative systems necessary to deliver a "tell us once" approach.

» **Regulators should streamline inspections and enforcement activity** through coordination with each other to minimize burdens on businesses.

» **Governments should seek out opportunities for increased co-regulation and self-regulation** of industries in sectors where they can be assured of strong levels of quality control through robust data-sharing agreements, spot audits and broad oversight of market operations.

The advent of new technologies has opened up a host of new options for governments and regulators in how they can conduct consultations and engage the public. By broadening and improving the way they do consultations, government and regulators can improve the quality of the regulations they do create, the efficiency of their enforcement of the rules, and the climate for innovation. The successful deployment of these new techniques, however, requires expertise and training of its own.

» **Re-think how existing consultation approaches can become more user-friendly,** relevant and timely. Possible approaches include:

»» Building a Centre of Excellence for Consultations within government to support departments and regulators when they are designing and conducting their consultations.

»» Making greater use of Innovation Labs that bring stakeholders from a host of different backgrounds and perspectives together over the course of regulatory or policy development and piloting exercises.

»» Involving participants in consultative exercises in the design of the consultation itself to ensure that participants feel that they have had a chance to not only answer the questions that government is interested in but to also communicate to government their understanding of the issue and their priorities and concerns.

»» Increasing the use of service standards and client-satisfaction as a key performance indicator for consultations.

Governments and regulators need to recognize the importance of the migration to digital and take the actions necessary to facilitate this shift and ensure that government itself is sufficiently established online that it is able to engage adequately with the public in this environment.

By taking the steps needed to ensure a vibrant and competitive digital ecosystem and by ensuring that citizens and businesses are able to comprehensively engage and interact with government and regulators in this space, government can increase the efficiency of its regulation and enable innovative new benefits for the public.

» **Explore new ways of encouraging competition in the digital economy.** For example, requiring companies to make their customers' data more portable so that they can more easily switch between platforms and other online services.[119]

» **Examine ways to build-out emergent digital government initiatives**, such as online tax filing, into a more comprehensive online identity verification system capable of supporting citizen interactions with government across the whole range of its responsibilities.

One of the most important features of technological innovation is its fast-paced character. The rapid speed at which changes are occurring represents one of the biggest challenges for governments and regulators in this context as they seek to use regulatory and legislative tools designed for different, more gradual changes to govern the technology sector. The need for speed and constant updating to avoid obsolescence means that alternative techniques and approaches to regulation could yield important benefits.

» **Sunset clauses or periodic regulatory reviews** should be a regular feature of any legislation or regulation that risks obsolescence due to technological progress.

» **The potential use of standards-based solutions** — either instead of or in conjunction with regulation and legislation — should be explored as a matter of course, particularly for technical areas and for sectors that are changing at a rapid pace.

As was discussed earlier, risk-based approaches to inspection and enforcement offer significant scope for improvements on many fronts. In addition to reducing the regulatory burden on compliant firms, they can also increase the likelihood that inspections will catch regulatory violations that are occurring. Moreover, given developments in big data and artificial intelligence, risk-based approaches are only becoming better able to fulfill their significant promise.

» **Where possible, governments and regulators should adopt more risk-based approaches** to inspection and other regulatory enforcement activities. Leveraging internal data and data available from firms to enable a focus on high-risk and repeat violators will ensure limited public resources are appropriately targeted.

119  The Economist. 25 February, 2010. "New rules for big data." *The Economist*. http://www.economist.com/node/15557487.

New technologies are already beginning to transform lifelong learning from a poorly realized ambition into a whole new educational paradigm – one in which government can, and needs to become, a leader.

# 6 CONCLUSION

The advent of a host of new technological innovations is dramatically reshaping the Canadian and global economies. These innovations – which include the increasing automation of work, the rise of peer-to-peer and platform-based business models, the mobile Internet, growth in big data analytics, improvements in artificial intelligence, and digitization – are enabling new business models and the creation of a host of valuable new goods and services. Simultaneously, these changes are unleashing new challenges for governments and regulators – as is the quickening pace at which these changes are occurring.

In this paper we have identified a number of these trends and illustrated how they are both impacting the lives of consumers and testing governments and regulators' abilities to govern them in the public interest. More specifically, we identified a series of challenges confronting governments and regulators ranging from the structure of government, to the need for better engagement with stakeholders, to the necessity of increasing the skills and competencies of government workers and regulatory staff. We have also explored how these technological changes offer governments and regulators new opportunities to advance their objectives.

While there are many different ways in which technological changes can be simultaneously better governed and leveraged to increase public safety and spur even more innovation, four approaches from other jurisdictions seem especially promising. By bringing design thinking into the regulatory process, enhancing capacity within government, reducing the regulatory burden and encouraging strong market

competition, Canada and its regulators can take a number of immediate steps to help strengthen our regulatory framework while simultaneously reducing its burden on innovators.

Each of these four approaches offer a host of potential actions that could be implemented to help increase governments' and regulators' capacities, alleviate some of the structural issues they face, and enable a host of innovative new strategies. For instance, by recommitting to attracting technically skilled individuals into the public service, but also making full use of opportunities that already exist for their workers to gain skills and experiences both within and outside of government, governments' and regulators' can increase their store of in-house expertise. Similarly, new technologies are already beginning to transform lifelong learning from a poorly realized ambition into a whole new educational paradigm – one in which government can, and needs to become, a leader.

Reductions in the regulatory burden faced by innovators represent another area where changes to the status quo can make a significant difference. By doing a better job of measuring the regulatory burden confronting businesses, governments can begin to tackle an important constraint on innovation. But while simply measuring this burden is an important first step, to truly capture the potential of this change, government also needs to set up systems to ensure that the implications of this measurement are understood and acted upon. New ideas such as an Innovation Advocate and an Innovators Defence Fund offer potential solutions to a number of the problems identified in this report which revolve around a lack of an effective constituency for innovators.

Finally, new innovations both enable and underline the need for improved forms of consultation between governments and regulators, those being regulated, and the broader public. By building a Centre of Excellence for Consultation, governments can take a leadership role in designing and developing best practices for consultation that can be used across the whole-of-government. By ensuring that these best practices integrate the best innovative new techniques, governments can ensure that Canadians are not only benefitting from the higher quality regulation that it will produce, but that the consultation process also serves as a trust-building exercise between governments and regulators and the stakeholders they serve.

As in many other areas, accelerating technological innovation offers both opportunities and challenges for government and the ways it governs. Regulation is a critical part of this picture, both in the ways that it helps ensure the public's health, safety and a fair and competitive marketplace, but also in the ways that it can stifle a country's economic dynamism and productivity.

As Canada seeks to put more of its economy on a knowledge-based footing, the regulation of rapidly changing technological industries will assume an even greater importance for the country's competitiveness and prosperity. By proactively focusing on the issues raised in this report, policymakers and regulators can make a significant and positive contribution to Canada's future.