Report on Tech.Law Fest 2018 in Singapore

Tech.Law Fest 2018, jointly organized by SAL and CORP, 4 - 6 April 2018 in Suntec Singapore
Conference Report

Author: Dominika Nestarcova

This report is based on the proceedings of the Tech.Law Fest 2018 in Singapore and the accompanying roundtable discussions on the developments in disruptive technologies. The conference brought together leading thinkers in the space of Technology Law and leading makers in the space of Legal Technology (accessible at https://techlawfest.com/). The main conference, themed "Smart Regulations for a Digital Economy", was a deep dive into the novel regulatory approaches which are being explored and tested to help societies and businesses navigate the rapid pace of technological advancement and the legal conundrums which arise. The views expressed in this report reflect the author's personal opinions and do not necessarily reflect the policies or views of the Centre for Banking & Finance Law.

This report may be cited as: Dominika Nestarcova, *Report on Tech.Law Fest 2018 in Singapore*, Centre for Banking & Finance Law, Faculty of Law, National University of Singapore, February 2018, report number CBFL-Rep-1804 [https://law.nus.edu.sg/cbfl/pub_reports.html]

Centre for Banking & Finance Law
Faculty of Law
National University of Singapore
Eu Tong Sen Building
469G Bukit Timah Road
Singapore 259776
Tel: (65) 6601 3878
Fax: (65) 6779 0979
Email: cbfl@nus.edu.sg

http://law.nus.edu.sg/cbfl/

The Centre for Banking & Finance Law (CBFL) at the Faculty of Law, National University of Singapore, focuses broadly on legal and regulatory issues relating to banking and financial services. It aims to produce research and host events of scholarly value to academics as well as of policy relevance to the banking and financial services community. In particular, CBFL seeks to engage local and international bankers, lawyers, regulators and academics in regular exchanges of ideas and knowledge so as to contribute towards the development of law and regulation in this area, as well as to promote a robust and stable financial sector in Singapore, the region and globally.

Report on Tech.Law Fest 2018 in Singapore

Dominika Nestarcova

Abstract

Tech.Law Fest 2018 conference evidences of Singapore's lead in digitally transforming its legal and financial sector by grooming technology start-ups, incubating new business models and services. As e-commerce becomes all-encompassing, interconnectivity advances, artificial intelligence (AI) matures and blockchain technology becomes commonplace, the laws of technology are having to respond more innovatively to balance public and private interests. Technology's impact on the practice of law is an undeniable reality. Areas such as data analytics, computational law, machine learning and predictive analytics are changing the nature of financial and legal services and challenging the regulatory landscape of the 21st century. The present report outlines the novel regulatory approaches which are being explored and tested to help societies and businesses to streamline their processes. It analyses how the emerging technologies should be regulated to encourage responsible innovation and what the legal issues are which surface as a consequence of technological advancements. The report will introduce the current trends in digital transformation and technologies which hold the promise of revolutionizing the financial industry. The observations made are based on the Tech.Law Fest proceedings with a specific focus on the role of big data and data analytics and the role of AI and machine learning. The report will conclude with AI's legal implications and regulation.

Table of Contents

I. Digital Transformation in Singapore

Digital transformation within companies and institutions around the world is on the rise. Its objective is to use technology such as machine learning, cloud computing, artificial intelligence, document management tools, chat-bots and cryptocurrencies to enable businesses to be more agile and efficient. Innovation through technology has become the catch-phrase of 21st century, as digital transformation brings not only a change in the operating business model, but also a cultural shift. While digital transformation addresses many of the regulatory and compliance aspects of financial institutions, it simultaneously introduces a new set of risks. It presents both legal practitioners and regulators a new set of challenges in terms of conceptualizing and understanding the new technologies and designing appropriate regulatory responses. The present report outlines the novel regulatory approaches which are being explored and tested to help societies and businesses to streamline their processes through technology. It analyses how the emerging technologies should be regulated to encourage responsible innovation and what the legal issues are which surface as a consequence of technological advancements.

II. Singapore and Smart Regulation

Speaking at the Tech.Law Fest, Vivian Balakrishnan, the Minister-in-Charge of Singapore's Smart Nation Programme Office, outlined a clear vision for Singapore's future as a 'smart nation'. An essential foundation of pursuing the smart nation initiative rests on 'smart regulation'. Indeed, smart regulation is a pertinent theme today in relation to how upcoming technologies interact with public and private persons. Balakrishnan identified a number of themes, which have enabled and are fostering the current technology space in Singapore: (i) marginal unit cost of replicating, storing and transmitting of information are near to zero, (ii) the marginal unit cost of computing has decreased, (iii) the technology 'clock-speed' has accelerated, while the regulatory clock-speed has not kept up, (iv) increase in the network of sensors worldwide enabling the explosion of data, (v) our capacity to synthetize data – mine it, analyse it and extract insight from it, (vi) robotics disrupting production chains and manufacturing and (vii) machine learning deployed with AI.

More fundamentally, as these trends combine and create network effects for an Internet of Things, policy-makers need to stand ready to predict the societal impacts and prepare people for the tech revolution to come. The next technological revolution is inevitable and it would be foolish to obstruct its progress. Nevertheless, there is a need for rules and regulations. What mind-sets and actions do governments and policy-makers need to adopt in order to create spaces for experimentation while protecting against exploitation? Perhaps, forms of ex ante regulatory clearance and industry codes of conducts with best practices will be the preferred choice by regulators as a more agile and community-driven alternative to hard-touch regulation.

The conference roundtables made it clear that smart regulation is the preferred approach by Singapore's regulators in today's digital age. At its core, smart regulation is about choosing the right shade of regulation, instead of front-running the technological advancements. This position was evident in Singapore's regulatory approach to Uber, the peer-to-peer ridesharing and transportation company.[1] Instead of imposing a licensing requirement on Uber, the company was treated as an

---

[1] See: https://www.uber.com/en-SG/

application platform, which connects riders and drivers. Licensing Uber would have inhibited its entry to Singapore and displayed a lack of understanding of Uber's business model. The counter-argument to smart regulation is that it allows less credible market entrants into Singapore. This is not, however, necessarily true as at the heart of smart regulation is a risk-specific and activity-based approach. If a non-regulated entity becomes too risky as it establishes a market presence, the regulation can always step in and regulate according to the level of risk vis-à-vis the market. Risk-specific and activity-based regulation is based on the test of materiality and proportionality. Materiality refers to the necessary level of risk which would warrant regulation, and proportionality refers to the right-sizing of regulation to the business.

There are three main components that characterize Singapore's smart regulation. These include the regulatory sandbox, wait and see approach and a waterfall approach. The FinTech Regulatory Sandbox functions to provide a conducive environment for incubation of innovative companies, which are uncertain over whether their services meet the regulatory requirements.[2] PolicyPal – an insurance broker has graduated from the sandbox and Kristal Advisors – a wealth management company has also entered the sandbox in providing AI-based advisory solutions. Not only is the Sandbox a form of an innovation incubator, it also functions as a positive feedback loop for regulators in allowing for reflection on whether certain requirements can be removed as too burdensome. Secondly, Monetary Authority of Singapore (MAS) is pursuing a 'wait and see' approach, or as Balakrishnan named it 'a masterly inactivity', whereby MAS is paying a close attention to technological developments, but is not attempting to regulate with a heavy hand.[3] Thirdly, it follows a 'waterfall approach', threading carefully in developing an understanding of new technologies and establishing engagement from stakeholders. The approach involves the appointment of a working group or committee to consider perspectives of stakeholders, draw up regulations or a proposal, and seek further consultations. This method works well in a slow-speed environment and it is open to question whether it is the most effective approach in the fast-changing world of technology, given that consultations and working committees often take several months to come up with proposals to regulate.

Example of smart regulation: cloud services

Smart regulation is inherently flexible in its approach to meet the internal needs of the industry, while balancing between regulation and innovation. Cloud computing involves storing and accessing data and programmes over the Internet, instead of storing them on a computer's hard drive. Initially, regulators may have characterized cloud services as a form of traditional outsourcing. However, given that the cloud is entirely online-based, it presents a different set of risks and regulatory red flags. MAS, together with a close partnership with Microsoft and other significant stakeholders/providers of cloud services for the financial sector, have in a flexible manner accommodated the cloud services by updating the Outsourcing Guidelines in 2016 and streamlined the technology adoption, thereby providing clarity on its regulatory expectations and addressing many of the misconceptions that had

---

[2] MAS, 'FinTech Regulatory Sandbox' http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/FinTech-Regulatory-Sandbox.aspx

[3] On how to regulate disruptive technological innovation, see Fenwick, Mark and Kaal , Wulf A. and Vermeulen, Erik P. M., Regulation Tomorrow: What Happens When Technology is Faster than the Law? (September 4, 2016). Lex Research Topics in Corporate Law & Economics Working Paper No. 2016-8; U of St. Thomas (Minnesota) Legal Studies Research Paper No. 16-23; TILEC Discussion Paper No. 2016-024. Available at: https://ssrn.com/abstract=2834531

previously slowed the financial industry's adoption of the cloud.[4] Following the Outsourcing Guide amendment, the Association of Banks in Singapore (ABS) introduced the ABS Cloud Implementation Guide (ABS Guide), a non-binding practical guide designed to assist banks in Singapore as they implement cloud services. Through stakeholder engagement, the regulator was able to establish a dialogue about the technology and understand both practical and legal implications of using the cloud. In turn, this allowed amendments that instead of stifling the potential of the cloud, created a stimulus for its adoption. The key was creating an environment of legal and practical clarity for the users and drafting of regulation that is not disconnected from technicalities of adoption. In turn, the stakeholders built up on the regulatory clarity by drawing up best practices and establishing a principle-based approach to communicate with customers the basis on which the cloud operates.[5] Self-regulation helps regulators to achieve a consistency of language and practice, thereby providing for a common baseline approach. From a company perspective, the use of standards creates trust for customers.

III.   Legal considerations

LEGAL CLARITY

It becomes evident that within this space, both lawyers and academics can occupy a middle-ground as enablers. In order to facilitate digital transformation, there needs to be legal clarity on where the technology falls within the regulatory requirements and how we conceptualize it, or whether it requires new regulation and new legal definitions. There are two issues present: firstly, we need to ensure legal clarity by applying existing legal principles to the technology in question. The fundamental legal issues do not disappear by virtue of the use of a new technology - any legal and regulatory issues pertaining to the operation of the company will continue to exist. Companies and financial institutions, which are supervised by regulators, will continue to be regulated according to the business that they are engaged in, as regulation is principle-based and technology-agnostic. Secondly, what may change is the way these principles are achieved. Technologies pose different risks and the approach needs to be customized to the pain-points. This may include new legal risks relating to laws on intellectual property, data privacy and consumer protection. With regards to data privacy, some technologies may be more prone to mishandling data and customized precautions need to be taken.

IV.   Big data (analytics) and artificial intelligence

The TechLaw.Fest 2018 considered the deployment and legal considerations of a number of technologies, but it was data analytics and AI that attracted the most interest among developers and regulators alike. The following two sections will consider their legal and regulatory implications.

---

[4]   Microsoft, 'Singapore: Cloud in Financial Services – Regulatory Overview' Available at: https://www.microsoft.com/en-sg/apac/trustedcloud/singapore-financial-service.aspx
[5]   Microsoft, 'Microsoft's commitment to a trusted, responsible, and inclusive cloud' Available at: https://news.microsoft.com/cloudforgood/policy/microsofts-commitment.html

BIG DATA

The term big data refers to high-volume, high-velocity information assets.[6] Data analytics uses the big data feeds to produce predictions by using a complex method of analytics to infer information from data sets from a variety of different sources. The data can be collected from various sensors, such as internet clicks, GPS data from satellite devices, video/audio networks, transactional applications, social media, wearable devices, payment devices, health information or weather sensors. The benefit of data analytics is that it allows any stakeholder to leverage on the trends and indicators that can be extracted from the data, make quicker decisions and increase efficiency based on data that was previously unusable or inaccessible. The process involves using text analytics, statistics, machine learning or data mining to analyse data. Some of the areas in which the financial industry may utilize big data analytics include budgeting, forecasting, measuring risk (identifying bad credit risk), accounting irregularities, new product development or a better understanding of market conditions.

RISKS AND CHALLENGES

As big data analytics brings benefits across industries, it also opens the door to a number of risks and challenges. Big data analytics poses challenges with regards to accuracy and over-reliance on data, which may be at the expense of other valuable indicators such as strategic goals or instinct. Big data may offer a number of patterns and correlations that need to be contextualized before being used. Extracting trends from data may lead to misinterpretation, manipulation, but also misuse for strategic purposes. It is also important to remember that data analytics is predictive in nature and its predictions are only as good as its data set. The major legal consideration with big data is data protection and privacy law. If a data set contains personal data, a business is under an obligation to comply with relevant data protection laws. In Singapore, the Personal Data Protection Act 2012 is applicable and a failure to comply may result in a serious data breach. Likewise, data security is a crucial consideration, whereby cyber security should be an in-built feature of internal processes. Big data is valuable and intellectual property rights and data licensing issues over who controls the data are important for every business, as they offer a competitive advantage and a monopoly over how and who uses the data sets. Both ownership of data and rights over databases, software and algorithms are relevant, as third party rights may also exist. Last, but not least, competition and anti-trust concerns have arisen in instances of large data sets.

REGULATORY RESPONSE

There are a number of outstanding regulatory matters which need to be addressed in the future with the aim of creating an environment conducive to big data analytics with in-built safeguards:[7]

    a. Privacy and data protection of data sets collected across a number of jurisdictions.
    b. Reconsidering the role of copyright law as an obstacle to data access by the wider public.

---

[6] 'Big data is a term applied to data sets whose size or type is beyond the ability of traditional relational databases to capture, manage, and process the data with low-latency.' See Amazon, 'Big Data Analytics' Available at: https://www.ibm.com/analytics/hadoop/big-data-analytics

[7] For an elaboration on further challenges within the larger context of FinTech, see: Zetzsche, Dirk A. and Buckley, Ross P. and Arner, Douglas W. and Barberis, Janos Nathan, From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance (April 28, 2017). New York University Journal of Law and Business, Forthcoming; European Banking Institute Working Paper Series 2017 - No. 6; University of Hong Kong Faculty of Law Research Paper No. 2017/007; University of Luxembourg Law Working Paper No. 2017-001. Available at: https://ssrn.com/abstract=2959925

c. A systemic approach to identifying the owners of data sets and the scope of their rights.
d. Preventing content publishers from abusing their positions in monetizing data mining.
e. Patentability of data mining software as the mining tools become more widely available and adopted across financial institutions.
f. Allocation of liability and accountability in cases of misuse and abuse of data.
g. Preventing algorithmic bias.

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

AI dates back to the 1950s when the computer scientist Alan Turing proposed a test for machine intelligence: If a machine can trick humans into thinking it is a human, then it has intelligence. The term 'AI' was coined in 1955 by computer scientists John McCarthy, to describe the science and engineering of making intelligent machines. There is a difficulty in conceptualizing artificial intelligence (AI) as definitions are always contextual. Robotics and machine learning often get thrown into the definition without a genuine understanding of what the technology does. The panellists of the 'Regulating Intelligent System's' panel agreed that there are two conceptions of AI; narrow and general AI. Narrow AI performs a single task – whether it is pattern recognition, speech/image recognition, natural language processing or playing chess. It seeks to eliminate poor human performance and works within the tasks it has been designed for. General AI is considered to be human-level AI – an intelligence that can reason and understand as a human.

Today, AI and machine learning are revolutionizing the financial industry. The use-cases are all around us, including chat-bot brokers using predictive analytics to help traders decide what price to quote, fraud detection, robo-advisors providing financial planning services or automation of underwriting by evaluating risk and exposure of potential clients. Fundamentally, any area of banking and finance exposed to human error and judgment may apply some form of Narrow AI. AI is about computers understanding the world, recognizing patterns, learning and reasoning, thereby assisting humans in daily tasks. AI has been subject to increased media and regulatory oversight in view of wider tech developments, including the increased availability of big data; growing cloud computing power; and more powerful algorithms.
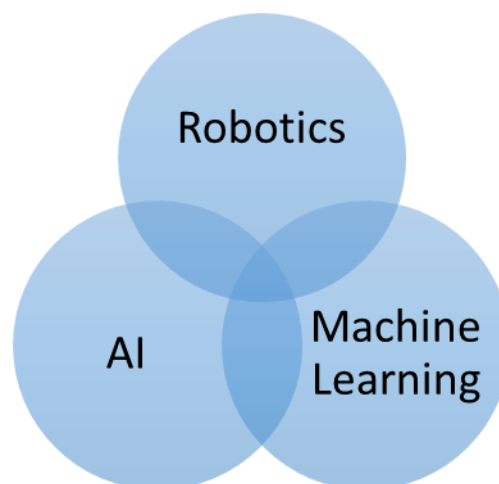
Robotics is about making machines that move. Machine learning is about making machines that learn (for example, ATM cheque readers) and AI is about making machines that appear smart, for example, the 1997 Deep Blue chess-playing computer from IBM, which defeated the world chess champion Garry Kasparov. These concepts may intersect: an AI and machine learning example is the AlphaGo, Google's AI, defeated the world champion in the game of Go; the combination of AI and robotics is an auto-pilot on a plane; and the combination of robotics and machine learning is Roomba, the smart vacuum cleaner that learns to navigate and clean homes.

RISKS AND CHALLENGES

Despite the promises offered by AI, we cannot afford to look at AI without critical eyes. AI will bring about dramatic changes, some of which are hard to imagine today. AI will be one of the most transformative technologies of the 21st century. While it holds enormous potential in addressing some of our most pressing societal challenges, it will without doubt impact many aspects of our day-to-day lives, including how we work and do business. The societal implications are yet to be explored and addressed by regulators – what kind of society do we want to live in? How will AI restructure the way we live and work? This rise of machines that behave like humans is creating a great deal of uncertainty. What jobs will this new technology eliminate? What jobs will it create? How will we manage the ethical implications of AI?

AI will never be able to replace human judgment. It is as useful and smart as its inputs. The predictive qualities of AI hold unquestionable benefits. AI makes predictions based on past data and cannot possibly predict societal changes and progressive thinking. Nevertheless, AI technologies operate in real world and raise issues of accountability and liability. In order to understand where liability lies and how to ex ante allocate risk, we need to first understand the complexity of the particular AI technology. A recent crash of the Uber car in Arizona highlighted the issue of legal liability for autonomous vehicles. In such instances, several parties could be liable – manufacturers, programmers, platform operators or even drivers.[8] Do the traditional negligence principles apply? To complicate matters further, if the said AI technology is made of a complex set of different software, it becomes difficult to establish who should be liable. What distinguishes AI as a particularly difficult area to apply the principles of negligence and product liability is the fact that the majority of AI technologies are based on machine learning and are not meant to be a 100% fool-proof product. Their performance advances are based on gained experience and data. In a way, the product is constantly developing. Therefore, it is questionable whether AI developers should be held liable for a product which operates correctly, but has made a wrong decision based on lack of experience/knowledge. For the aforementioned reasons, many have argued for increased transparency and AI explaining itself – making it explainable and accountable and allowing the regulators to assess the accuracy and thinking behind its decisions. This is often difficult in practice, as some AI reasoning is not capable of explanation in human terms. For example, the developers behind AlphaGo, which defeated the world champion in the game of Go could not explain why the algorithm came up with certain moves as the game progressed. Nonetheless, what can reasonably be expected from AI today is that it meets cyber security standards required from other technologies.

---

[8] See https://www.bloomberg.com/news/articles/2018-03-22/video-said-to-show-failure-of-uber-s-tech-in-fatal-arizona-crash

REGULATING AI[9]

It is evident that regulating AI is not an easy task and as it stands today, the regulators in Singapore are still in the process of designing regulation that is multi-disciplinary, iterative and adopts sufficient precautions to deal with potential harm. The approach to AI is in form a waterfall approach, whereby the convening of committees, public consultations and stakeholder engagement are taking place. For example, the National Research Foundation (NRF) and the Infocomm Media Development Authority (IMDA) are currently collaborating with an Institute of Higher Learning (IHL) to set up a Research Programme on the Governance of Artificial Intelligence (AI) and Data Use.[10]

Some existing laws already apply to AI, especially tort and privacy law, and we're starting to see a few specific new regulations emerge. What is yet to emerge is a cross-sectoral practical of 'AI law'. As envisioned my Microsoft, within the next 20 years, we can predict lawyers practicing AI law and simultaneously relying on AI within their practice.[11]

SELF-REGULATION

The current state of self-regulation among key stakeholders calls for a principle-based approach to AI, in order to ensure that AI is developed in a responsible manner so that people will trust it. Therefore, AI needs to be principled-by-design. For that purpose, the stakeholders need to develop a shared understanding of the ethical and societal implications of AI and create a common framework of principles for AI developers. In his keynote speech, Microsoft's President Brad Smith identified six ethical principles including:

(i)   **Fairness:** AI needs to be able to understand where the data is coming from and not make skewed judgments leading to discrimination. If the data is biased, so will AI's decision making.

(ii)   **Reliability and safety:** well-established legal norms, including product liability will need to evolve to address the new factual circumstances that AI brings.

(iii)   **Privacy security**: apply privacy laws and fill in the legal gaps ex post.

(iv)   **Inclusiveness:** AI must address a broad range of human needs and be inclusive by design. Without inclusiveness, the AI may unintentionally exclude individuals.

(v)   **Transparency**: people need to know how AI works and it is the responsibility of both developers and regulators to be engaged in this conversation.

(vi)   **Accountability:** A Hippocratic Oath for AI developers.

---

[9] More on approaches to regulating AI, see Scherer, Matthew U., Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies (May 30, 2015). Harvard Journal of Law & Technology, Vol. 29, No. 2, Spring 2016. Available at: https://ssrn.com/abstract=2609777

[10] NRF, 'AI Singapore' Available at: https://www.nrf.gov.sg/programmes/artificial-intelligence-r-d-programme

[11]   Microsoft,   *The   Future   Computed*   (2018)   Available   at: https://msblob.blob.core.windows.net/ncmedia/2018/01/The-Future-Computed.pdf p.10