INTRODUCTION – WHAT IS FINTECH?

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A. INTRODUCTION

Largely shrouded in hype and obscured by hyperbole, the word 'FinTech' is simply a combination of the words 'financial' and 'technology'. It describes the use of technology to deliver financial services and products to consumers. This could be in the areas of banking, insurance, investing – anything that relates to finance. Increasingly, FinTech is coming to represent technologies that are disrupting traditional financial services, including mobile payments, money transfers, loans, fundraising and asset management. Yoshi Kawai, General Secretary of the International Association of Insurance Supervisors, a member organisation of the Financial Stability Board, offered a working definition of 'FinTech' as follows: it is a 'technologically enabled financial innovation. It is giving rise to new business models, applications, processes and products. These could have a material effect on financial markets and institutions and the provision of financial services'.¹ **1.01**

This chapter proceeds as follows: Part B describes the development of FinTech and its key features, Part C describes key players, products and **1.02**

¹ International Association of Insurance Supervisors Newsletter (June 2016), at 2.

trends, Part D analyses regulatory responses to FinTech and the impact FinTech will have on the legal practice. Part E concludes.

B. WHAT IS (AND ISN'T) NEW ABOUT FINTECH?

1.03 While some financial industry observers argue that FinTech has been around for decades and forms the lifeblood of all financial institutions (think ATMs), others posit that *this time is different* and that FinTech represents a phenomenon distinct from earlier eras of innovation. Both camps agree that it is the rapid evolution of FinTech over the past decades that has been transformational for the financial sector. A number of factors have conflated to turn FinTech into the poster child that continues to grab the headlines. First, following the 2008 global financial crisis, the brand image of banks was severely shaken. Such scandals as the LIBOR-fixing and foreign exchange price manipulation did not do banks any favours in terms of restoring public trust in the banking industry. For example, a 2015 survey reported that Americans trusted technology firms far more than banks to handle their money.² In addition, the global financial crisis damaged bank profitability and competitiveness, and the ensuing regulation drove compliance costs to record highs while simultaneously restricting credits. Requirements regarding ring-fencing, the preparation of recovery and resolution plans, and the performance of stress testing only contributed to rising bank costs. The crisis further led to large-scale redundancies, leaving many professionals seeking to apply their skills to new outlets.³

1.04 This, in turn, coincided with the rapid rate of technology development, high level of smartphone penetration and genuine sophistication regarding APIs. In today's digital age, people are seeking easy access, convenience, efficiency and speed. They want to conduct transactions via mobile technology platforms and applications, and such activities include managing their financial lives – from tracking their overall spending to applying for a loan and optimising their investment strategies. Given the level of service expectations from customers, there is no excuse for businesses not to embrace the latest technologies – and those who refuse will certainly be losing business. Moreover, the widespread adoption of mobile and internet technology is being driven by a change in

2 Banktech, Survey Shows Americans Trust Technology Firms More Than Banks and Retailers (25 June 2015), available at: <https://gomedici.com/survey-shows-americans-trust-technology-firms-more-than-banks-and-retailers/>.

3 Douglas W. Arner, Janos Barberis and Ross P. Buckley, FinTech and RegTech in a Nutshell, and the Future in a Sandbox, CFA Institute Research Foundation (2017), at 6.

demographics in emerging markets with a more technology savvy and connected generation of middle income investors. Investors between the ages of 18 and 34 are more likely to be internet and smartphone users and to participate in social media networks, compared to those aged 35 and older. As the income of this younger generation increases over time, it is expected that it will further drive the market size for FinTech.⁴

Importantly, not only is more information stored online, but the pace of data-creation and its rapid availability to those seeking it has accelerated exponentially. For example, unlike in earlier decades, where information on underlying loans or mortgage-backed securities was sourced through central nodes of information, like credit rating agencies or conventional news organisations, the production of digital data is often decentralised, and emerges from a variety of websites, social media outlets and various types of news sources and databases.⁵ Collectively, these developments are enabling the production of not only more data than in the past, but also *new* kinds of meta and secondary data not previously accessible. FinTech firms can scour the internet, including social media and mobile phone records for insight into customers. The cloud can help create secondary data based on the analysis and mining of original data.⁶ **1.05**

Closely related to the above is growing disintermediation driven by technology and the internet. For example, Tripadvisor combined with online travel agencies is disintermediating physical travel agencies, Amazon is disintermediating bookstores, iTunes is disintermediating CDs, Airbnb is disintermediating hotels, and Uber is disintermediating holders of official taxi operating licences. Similarly, innovative FinTech business models are disintermediating certain regulated activities. For instance, online equity crowdfunding platforms are disintermediating stock exchanges and underwriters and banks, peer-to-peer lending platforms are disintermediating banks and other lenders, and robo-advisers are disintermediating traditional financial advisers.⁷ Advances in big data and machine learning have made it easier than ever for firms to cull information from traditional as well as alternative data sources, and develop new infrastructures designed to render irrelevant or bypass certain services of intermediaries like banks or securities **1.06**

4 See Pew Global Research, *Smartphone Ownership and Internet Usage Continues to Climb in Emerging Economies* (2016).

5 Chris Brummer and Yesha Yadav, *FinTech and the Innovation Trilemma* (Spring 2018), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3054770, at 28.

6 *Ibid.*, at 29.

7 OICU-IOSCO, *IOSCO Research Report on Financial Technologies (FinTech)* (February 2017), at 7.

underwriters. By harnessing big data, algorithms and AI, firms are increasingly linking services and products directly with consumers, whether they are investors, entrepreneurs needing capital or borrowers.⁸

1.07 FinTech firms have attracted substantial investment in recent years, while public interest has grown significantly. Most firms have remained small – reflecting their knowledge-based business model, but investment in them has risen substantially. By June 2018, total global investment in FinTech companies reportedly hit USD 57.9 billion.⁹ Venture capital investment has also risen steadily, from USD 0.8 billion in 2010 to nearly 20 billion by June 2018.¹⁰

C. KEY PLAYERS, PRODUCTS AND TRENDS

1.08 When people think of FinTech, they often focus on start-ups that are breaking into areas that banks and other legacy financial institutions have dominated. However, as illustrated in the Figure 1.1, the ecosystem of FinTech companies is considerably broader and covers:

- incumbent, well-established financial institutions such as HSBC, Barclays, Bank of America and Allstate, which are acquiring or working with FinTech start-ups and building their own innovative solutions;
- big technology companies that are active in the financial services space but not exclusively so, such as Apple, Google, Facebook, and Twitter;
- companies that provide infrastructure or technology that facilitates financial services transactions, such as MasterCard, Fiserv, First Data, various financial market utilities, and exchanges such as NASDAQ; and
- disruptors – the fast-moving companies, often start-ups, focused on a particular innovative technology or process, such as Stripe (mobile payments), Betterment (automated investing), Prosper (peer-to-peer lending), Moven (retail banking), and Lemonade (insurance).¹¹

1.09 As an umbrella term, FinTech covers many technological disruptions related to finance. They can be classified in several categories: payments, insurance, investment advice, securities clearance and settlement, and alternative funding

⁸ Brummer and Yadav, *supra* note 5, at 37.

⁹ KPMG, The Pulse of FinTech 2018, available at: <https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/07/h1-2018-pulse-of-fintech.pdf>, at 4.

¹⁰ *Ibid.*, at 9.

¹¹ PWC, What is FinTech? (2016), available at: <https://www.pwc.com/us/en/financial-services/publications/viewpoints/assets/pwc-fsi-what-is-fintech.pdf>, at 2.

Figure 1.1 FinTech players

platforms, all of which are enabled by cross-cutting technologies such as data analytics, distributed ledger technology/blockchain and cybersecurity. Table 1.1 lists key technologies and real-life examples associated with each of these categories.

Table 1.1 Real-life examples and technology disruptions related to finance

Category	Key technologies	Real-life examples
FINTECH USE CASES		
Payments	Mobile payments, smartphone wallets, digital wallets, acceptance devices, Central Bank issued digital currencies	Apple Pay, Android Pay, PayPal Mobile Express Checkout, Venmo, Square, TransferWise
Insurance	Online insurance platforms, online brokers, peer-to-peer insurance	Insureon, Knip, Oscar, Slice, Cuvva
Investment advice	Robo-advisory, digital wealth management, digital investment tools, tailored financial messaging	Motif, Wealthfront, Nutmeg, Juntos
Securities clearing and settlement	Digital assets, DLT-based solutions	Australian Stock Exchange (ASX) DLT settlement system, Hong Kong Exchange and Clearing Limited (HKEX)
Alternative funding platforms	Equity-based crowdfunding and P2P lending platforms	GoFundMe, Kickstarter, Lending Club, Funderbeam, Zelle, Crowdcube, Kabbage, Funding Circle

Table 1.1 (continued)

Category	Key technologies	Real-life examples
CROSS-CUTTING ENABLING TECHNOLOGIES		
Data analytics	Big data, artificial intelligence, machine learning	<i>Equifax NeuroDecision credit scoring, Credit Benchmark, Bloomberg Social Sentiment Analytics, Solovis, Kreditech</i>
Distributed ledger technology/blockchain	Private key encryption, proof-of-work, proof-of-stake (and other protocols), cryptocurrencies, smart contracts	<i>Bitcoin, Ethereum, Ripple Payment Network, Coinbase</i>
Cybersecurity	Encryption, authentication, biometrics	<i>Diebold iris-scanning ATM, Mastercard Biometric Card, TeleSign, Experian CreditLock</i>

1.10 Let us look more closely at some of these:

1. Mobile payments and e-wallets

- 1.11** Mobile payments and e-wallets have made a huge impact on how people transact. Most mobile payment systems are based on a prepaid balance that is transferred by SMS, near-field communication, or using codes, but post-paid or real-time payments are also possible. As distinct from some other forms of electronic banking, the transferred money is available immediately and, depending on the system, a bank may not need to be directly involved.
- 1.12** A natural extension of mobile payments, mobile wallets let users store money and credit cards on their mobile devices and transact through their phones without ever opening their actual wallet. Google's Android pay and Apple's Apple Pay are two of the most well-known mobile wallets. Paypal has been considered as one of the pioneers of the digital payments industry. After its acquisition by eBay, Paypal payments rapidly gained popularity and became the choice of payment method for the majority of eBay users. This led to a chain effect, giving rise to a whole new segment concerned with digital payments – payment gateways, security companies and fraud detection software, to name a few.

2. Open banking/APIs

Open APIs are perceived by a number of institutions (particularly in the European Union in view of the PSD2) as an opportunity to bring more tailored products to customers and offer new propositions. Through open APIs, institutions aim to ease the design and launch of new products to customers, taking advantage of the existing relationship of trust they may have built with customers, although it is yet unknown whether customers will consent to share their personal financial data with third-party providers.¹² **1.13**

Recognising a number of potential risks that open APIs pose to consumers, the European Banking Authority has developed regulatory technical standards, specifying the requirements for strong customer authentication, the requirements with which security measures have to comply to protect the confidentiality and the integrity of payment service users' personalised security credentials, and the requirements for common and secure open standards of communication.¹³ **1.14**

Mobile access and the internet have been transformational, allowing the gains from technological progress to be shared directly with billions of individual consumers whose mobile devices are now portals for accessing a full range of financial services, and can be extended by third parties via APIs. This massive decentralisation is opening the door to crowdfunding platforms that disintermediate banks and directly connect those looking for financing with potential investors. Crowdfunding now means that one can raise money quickly and cheaply from people all over the world that one has never met. It has democratised the process of finding start-up capital and shortened the timeline from perhaps months of meetings to as little as a few weeks.¹⁴ **1.15**

In addition, it is now also easier than ever for small businesses to accept payments. Even farm stands in remote locations can accept credit and debit cards with tools like Square. Additionally, companies like TransferWise are providing ways to transfer money internationally, disrupting that sector by offering a 90 per cent discount on traditional bank transfer fees.¹⁵ **1.16**

¹² Ibid., at 78.

¹³ European Banking Authority, Final Report, Draft Regulatory Technical Standards on Strong Customer Authentication and common and secure communication under Article 98 of Directive 2015/2366 (PSD2) (23 February 2017), available at: <https://www.eba.europa.eu/documents/10180/1761863/Final+draft+RTS+on+SCA+and+CSC+under+PSD2+%28EBA-RTS-2017-02%29.pdf>.

¹⁴ Bernard Marr: *The Complete Beginners' Guide to FinTech Everyone Can Understand* (10 February 2017).

¹⁵ Ibid.

- 1.17** Another consequence of digitisation is that vast amounts of data now exist in forms that can be readily aggregated and analysed with computing power. Online and mobile applications that draw on these data make it possible for consumers to view banking and other financial account information, often held at different financial institutions, on a single platform, monitor the performance of their investments in real-time, compare financial and investment products, and even make payments or execute transactions. Applications can also assist with automatic savings, budget advice, credit decisions, and fraud and identity theft detection in real-time.¹⁶
- 1.18** In short, digitised record-keeping and its applications have exponentially improved a consumer's ability to make financial decisions. They have given rise to a new sector of non-bank financial institutions focused on products and services utilising data aggregation, based on data obtained with the consumer's consent. The rise of such financial institutions presents questions regarding the way in which they operate and are currently regulated.

3. Artificial intelligence (AI) and big data

- 1.19** Artificial intelligence (AI) and big data can parse vast databases through advanced algorithms to derive patterns used to predict behaviour and prices, and in the end mimic human judgement in automated decisions. Related applications can automate credit approvals or advice, facilitate regulatory compliance and fraud detection, and automate the trading of financial assets.
- 1.20** Recent work from the Joint Committee of the European Supervisory Authorities has found that big data brings many benefits for the financial industry and consumers, such as more tailored products and services, improved fraud analytics or enhanced efficiency of internal organisational procedures. On the other hand, consumers should be made particularly aware of some of the risks posed by big data. The risks identified include the potential for errors in big data tools, which may lead to incorrect decisions being taken by financial service providers. In addition, the increasing level of segmentation of customers, enabled by big data, may potentially influence the access to and availability of certain financial services or products.¹⁷

16 See Letter from the Center for Financial Services Innovation to the Bureau of Consumer Financial Protection, CFPB-2016-0048 Request for Information Regarding Consumer Access to Financial Records (21 February, 2017), available at: <https://www.regulations.gov/document?D=CFPB-2016-0048-0047>.

17 Joint Committee of the European Supervisory Authorities: *Joint Committee Final Report on Big Data* (15 March 2018), at 14.

4. Machine learning

A sub-category of AI, machine learning is a method of teaching computers to parse data, learn from it, and then make a determination or prediction regarding new data. Rather than hand-coding a specific set of instructions to accomplish a particular task, the machine is ‘trained’ using large amounts of data and algorithms to learn how to perform the task. Machine learning provides the financial sector with new methods of performing statistical analysis and performing tasks. Institutions and relevant service providers have already started using machine learning for a variety of purposes, such as credit scoring, for which it could improve services and pricing customisation, given its ability to process significantly larger amounts of data input than classic statistics analysis. For example, a number of new entrant FinTech firms are capitalising on this opportunity by leveraging on large amounts of data to produce challenger credit scoring models that assess creditworthiness faster and supposedly more accurately, and possibly also in cases where conventional data is not available.¹⁸ **1.21**

5. Biometrics

Biometrics identifies individuals through unique physical characteristics, such as facial recognition, fingerprint and iris verification, as well as behavioural patterns, such as voice identification. Biometric authentication gives financial institutions independence from passwords, PINs, and tokens, which are susceptible to attack, and can offer significant opportunities, ranging from security to mobile payment solutions.¹⁹ Notably, however, biometrics is not fool-proof and ramifications of any security breach involving biometric information is likely to be much more serious than a security breach involving a password or a PIN. **1.22**

6. Robo-advice

Robo-advice is an online service that uses algorithms to automatically perform many investment tasks done by a human financial adviser. Initially offered by start-ups, robo-advice is now part of the suite of services offered by major financial institutions such as Vanguard, Schwab and Fidelity.²⁰ Since they are less expensive than a human adviser, they democratise access **1.23**

18 European Banking Authority, Report on the Impact of FinTech on Incumbent Credit Institutions’ Business Models (3 July 2018), ¶ 83.

19 Ibid., ¶77.

20 The Rise of the Robo-advisor: How Fintech Is Disrupting Retirement, Knowledge@Wharton (14 June 2018).

to financial advice – they can take on customers with few savings since adding one more person will not cost much more. While an automated advice model could help mitigate some of the risks associated with human advisers and managing a large salesforce, ultimately the design of the robo-advice model is crucial and a poorly designed model could lead to systemic mis-selling. Managing risks is ultimately the responsibility of the individual firm and its senior management.²¹

7. Blockchain

1.24 Blockchain is a unique type of computerised ledger, which relies on cryptographic techniques and new methods for consensus to capture and secure the data. It is designed to be read by a computer, rather than by the human eye. The following traits characterise blockchain:

- the ledger is shared among and worked on by multiple participants, none of which has a single point of control over it;
- an ever-growing chain of ledger entries ('blocks') links the entire history in such a way as to prevent tampering with or rewriting past records;
- digitally signed transactions or instructions indicate intent to record or modify data, or to transfer digital assets.²²

1.25 Blockchain technology offers a commonly agreed record of truth to multiple, mutually distrusting participants in an economic system. It uses a decentralised, peer-to-peer network comprised of many users, which maintains a ledger of transactions and relies upon multiple users to confirm the veracity and authenticity of such transactions using cryptography. Blockchain essentially provides a 'record book' of each component of a transaction and this record book is maintained and instantaneously authenticated on a network that is shared between a theoretically infinite number of computers. When all the members of the network approve a transaction, that transaction is added to the record book and such a transaction cannot be tampered with or altered.

1.26 A research report from Goldman Sachs offers a concise summary, explaining the core concept of how the consensus mechanism functions in a blockchain:

21 See Robo Advice: an FCA Perspective, a speech by Bob Ferguson, Head of Department, Strategy & Competition Division, Financial Conduct Authority (11 October 2017), available at: <https://www.fca.org.uk/news/speeches/robo-advice-fca-perspective>.

22 Michael Casey et al., *The Impact of Blockchain Technology on Finance: A Catalyst for Change*, Geneva Reports on the World Economy (2018), at 1, available at: <http://www.sipotra.it/wp-content/uploads/2018/07/The-Impact-of-Blockchain-Technology-on-Finance-A-Catalyst-for-Change.pdf>.

- (1) It is a database containing transactions between two or more parties, where the copies of this database are replicated across multiple locations and computers being the nodes.
- (2) This database is made of ‘a chain of blocks’, with each block containing data such as details of the transaction – the seller, the buyer, the price, the contract terms and other relevant details.
- (3) The transaction information contained in each block is validated by all nodes in the network via an algorithm called ‘hashing’. The transaction is valid if the result of hashing is confirmed by all nodes.²³

For most financial data, however, the world still relies on central intermediaries such as banks, accounting firms and governmental entities to create and maintain centralised, private databases, which keep track of such data and the transactions they comprise. In many cases, these databases are powered by obsolete, legacy computer systems that are inefficient, slow, costly and incompatible with other legacy systems. For most financial institutions, improving the customer experience has been their number one priority. Unfortunately, while the vast majority of banks and credit unions aim to compete and win new business by offering a personalised digital consumer experience that removes friction, existing bank infrastructure built on legacy systems may make this difficult.²⁴ **1.27**

A centralised database managed by one entity is susceptible to cyberattack and error, and in some parts of the world, is affected by political and state manipulation. Effectively, the central intermediaries, through their own private databases, determine: (i) the status of each transaction; (ii) the ownership of certain goods; and (iii) the speed at which a transaction is completed. By contrast, the possibility of recording data and transferring value without the mediation of trusted third parties means that the speed of such matters can be increased, while the costs are reduced by not just avoiding transaction fees, but also, for instance, the costs of security, supervision and enforcement.²⁵ **1.28**

As described in more detail in Chapter 6, most of the blockchain platforms being developed for use in financial services are ‘permissioned’, both in terms of who can access the network and who can update it. This means that access to the network is restricted to a list of known and approved parties, for example, banks who already trade with each other. The use of permissioned platforms might be preferable in some cases because financial institutions **1.29**

²³ Goldman Sachs, *Blockchain – Putting Theory in Practice* (2016), at 8.

²⁴ Ryan Middleton: *Why bankers and lawyers need to understand blockchain and smart contracts* (15 June 2018).

²⁵ *Ibid.*

handle sensitive data and need to know who they are dealing with on the platform. There are also practical benefits to permissioned networks: if only known and trusted users are admitted to the network, the consensus mechanism used can be significantly faster and more energy- and cost-efficient than in permissionless systems. Nevertheless, permissioned systems do not achieve the full potential of decentralisation that can be achieved through permissionless systems.

1.30 Many have recognised potentials of blockchain to, among other things, improve transparency and reduce transaction costs by better managing data and streamlining processes, improve supply chains, enable the tracking and management of intellectual property, improve reliability and traceability of records, reduce speed and cost of settlement, facilitate copyright and patent protection, and improve efficiency using automated reporting and smart contracts.

1.31 Yet, there are still significant challenges to broad application of blockchain:

- (1) First, performance (particularly transaction capacity and scalability) of blockchain is still an issue – no blockchain has yet been able to process billions of transactions in a second in a way that the current banking payment systems can.²⁶
- (2) Second, there are concerns about privacy and security, with some stakeholders, particularly in the law enforcement and regulatory sectors being concerned that the pseudonymous nature of blockchain-based records obscures the identity of actors. Moreover, the fact that data once stored on the ledger cannot be erased may be at odds with the ‘right to be forgotten’ granted in some jurisdictions.

As illustrated in Figure 1.2, design choices made by blockchain developers, particularly with respect to the degree of data distribution and decentralisation of control, often lead to inevitable trade-offs that must be made between performance, privacy and resilience (i.e., the degree of decentralisation). Hopefully, future technical advancements will alter these trade-offs.

- (3) Third, there are challenges relating to the interoperability: (i) between different blockchains, (ii) between applications built on the same blockchains, and (iii) between blockchain and legacy systems.²⁷ For example, in the potential area of application for post-trading settlement, it will be

26 House of Commons Treasury Committee, *Crypto-assets*, Twenty-Second Report of Session 2017–19 (September 2018), para 22.

27 See, e.g., European Parliament, *Distributed Ledger Technologies and Blockchain: Building Trust with Disintermediation*, P8_TA-PROV(2018)0373, para 40.

Source: HM Treasury, Financial Conduct Authority and Bank of England: Cryptoassets Taskforce: final report (October 2018), at 26.

Figure 1.2 Trade-offs in blockchain design

important to ensure interoperability among the systems of all current market participants (brokers, issuers, investors, trading venues and financial market infrastructure operators).

- (4) Fourth, there are concerns about the theft or loss of private keys, which allow the owners to control their digital assets and, if lost, the owners will lose such control. Private keys have been stolen in various high profile incidents. For example, hackers managed to steal nearly USD 500 million worth of Bitcoin from Mt. Gox in 2014 without breaching the Bitcoin blockchain protocol, which eventually led to the collapse of this Bitcoin exchange.²⁸
- (5) Fifth, there are trade-offs relating to the governance of blockchains, particularly with regard to software updates: while in a centralised environment, some trusted authority controls much of the governance of a system and is responsible for software updates, in the blockchain universe, for certain software updates, there must be a consensus among a distributed network, for which there is no controlling entity.
- (6) Sixth, for blockchain technologies to reach their potential, they must be fully brought within public policy and legal frameworks. Only with clear rules will there be broad adoption of blockchain technologies.²⁹
- (7) Seventh, as with the application of other new technologies, firms' use of blockchain may also raise a number of competition questions. For

²⁸ OICU-IOSCO, *supra* note 7, at 61.

²⁹ Casey et al., *supra* note 20 at 10–13.

example, if a permissioned blockchain network developed to become essential infrastructure (for example, in clearing and settlement), there could be competition concerns around access.³⁰

1.32 While it is still early days, several authorities have issued views on blockchain. For example:

- In 2016, the French Parliament voted a law (Law n°2016-1691 (art 120)), which authorised the French government to determine, by an ordinance, the rules that could allow for the holding and transfer of non-listed securities via a blockchain system.
- In 2016, Japan enacted amendments to the Payment Services Act, which came into force on April 1, 2017 and introduced the registration requirement for operators of ‘virtual currency exchange businesses’ (defined as businesses involving the exchange of virtual currency to legal currency or another virtual currency). In order to prevent money laundering and the financing of terrorism, a registered operator of a virtual currency exchange business is required to implement certain identity verification procedures, among other steps.
- In 2018, 26 EU Member States and Norway agreed to sign a Declaration creating the European Blockchain Partnership and cooperate in the establishment of a European Blockchain Services Infrastructure that will support the delivery of cross-border digital public services, with the highest standards of security and privacy.³¹

1.33 In addition, international organisations such as the International Organization of Securities Commissions, the Financial Stability Board, the Bank of International Settlements, the World Bank Group and the International Monetary Fund (IMF) are observing the developments of FinTech under their respective objectives. For example, in October 2018, the World Bank and the IMF launched the Bali FinTech Agenda, which offers a framework for the consideration of high-level issues by individual member countries, including in their own domestic policy discussions.³² After all, the rapid growth of FinTech products is an international phenomenon and is becoming an important component of the global financial system. As a result, regulators

30 HM Treasury, Financial Conduct Authority and Bank of England, *Cryptoassets Taskforce: Final Report* (October 2018), ¶ 3.12.

31 See Digibyte, *European Countries Join Blockchain Partnership* (April 2018), available at: <https://ec.europa.eu/digital-single-market/en/news/european-countries-join-blockchain-partnership>.

32 The Bali FinTech Agenda, available at: <https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/10/11/pp101118-bali-fintech-agenda>.

and standard-setting bodies are increasingly focusing their efforts on building a regulatory framework to support these new products, services and processes.

D. HOW SHOULD REGULATORS RESPOND AND WHY SHOULD LAWYERS CARE ABOUT FINTECH?

Evidently, FinTech offers wide-ranging opportunities, which national authorities are keen to foster. It holds the promise to reduce costs and frictions, increase efficiency and competition, narrow information asymmetry and broaden access to financial services – especially in low-income countries and for underserved populations – although the benefits of technological change may take time to fully materialise. **1.34**

At the same time, however, national authorities are rightly concerned about potential risks posed to the financial system and to its customers in terms of consumer protection, the clarity and consistency of regulatory and legal frameworks, the adequacy of existing financial safety nets, and potential threats to financial integrity. As technology alters financial service attributes and market structure, financial regulation must adapt to remain effective. In turn, regulation could also have an important influence on the development of technology. The following are some of the key issues that emerge: **1.35**

1. Distributed ledgers and data privacy

Spreading data over multiple nodes may facilitate access to private data, which in turn could violate data protection laws. The current regulatory landscape, following the recent implementation of the GDPR, raises data protection and customer consent as key requirements to be respected by all institutions. **1.36**

2. Rules governing ownership and contractual rights and obligations

Digital transformation of the economy and financial services requires wide-ranging changes to the regulatory system. For example, there is a need to modernise regulations for digitally communicating with consumers. Other regulations that should be implemented are discussed throughout this book and include: updating regulations to better facilitate secure access to digitised data; authentication of digital identity; and support for core financial service activities such as lending, payments, and investment advice. **1.37**

- 1.38** Moreover, DLT records the transfer of ownership of ‘digital tokens’, which are essentially units on a ledger. They can either have intrinsic value themselves (e.g., a ‘native asset’ like Bitcoin), or be digital representations of a physical or digital asset that exists outside the ledger. The legal status of a digital token and the legal effect of its transfer are not clear. For example, would the transfer of an asset-backed token (e.g., representing a security) on a ledger transfer legal ownership of the security, or would registration outside the ledger (e.g., in a corporate share registry) still be required? Jurisdictions are trying to develop answers to these questions but country practice varies, and will therefore require thought from policymakers.³³

3. Regulatory sandboxes

- 1.39** Regulatory sandboxes are testing grounds for innovative products, services and business models that can be tested without immediately being subject to all of the regulatory requirements. A regulatory sandbox provides valuable insights to policymakers in understanding new technologies and their applications, but is not a substitute for effective, permanent regulatory frameworks that will eventually need to be put in place.³⁴ For example, the UK Financial Conduct Authority (FCA), which was one of the first regulators in the world to introduce a FinTech sandbox, requires prospective participants to demonstrate that the product: offers genuine innovation – either ground-breaking or significantly different offering in the marketplace; creates a measurable benefit to consumers – either direct or indirect; is intended for the UK financial services market; needs to be tested in the sandbox alongside the FCA; and is ready to test (e.g., testing plans are well developed with clear objectives, parameters and success criteria; some preliminary testing has been concluded to date; the company has the tools and resources required to enable testing in the sandbox; and the company has sufficient safeguards in place to protect consumers).³⁵

- 1.40** Arguably, the greatest tangible benefits to sandbox firms are contacts with the regulator and the credibility that the participation in the regulator’s sandbox gives them vis-à-vis customers and financiers. On the flipside, one might argue that regulatory sandboxes create a ‘two-tier’ system of start-ups, where

³³ International Monetary Fund Staff Discussion Note, *Fintech and Financial Services: Initial Considerations*, SDN/17/05 (June 2017), at 17.

³⁴ *Ibid.*

³⁵ See FCA, *Applying to the Regulatory Sandbox*, available at: <https://www.fca.org.uk/firms/regulatory-sandbox/prepare-application>; see also FCA, *Regulatory Sandbox Lessons Learned Report* (October 2017), available at: <https://www.fca.org.uk/publication/research-and-data/regulatory-sandbox-lessons-learned-report.pdf>.

those that are selected in the sandbox are given a (possibly unfair) advantage. Moreover, one could also question if regulators have the requisite skillset to determine whether a business concept is innovative. Rather than emulating the model of corporate innovation accelerators, regulators may instead want to engage in a more open dialogue with all (or at least a less exclusive group) of innovative start-ups that need assistance navigating the maze of regulatory requirements. This is partly achieved through ‘*innovation hubs*’. These are essentially schemes set up by competent authorities to enable firms to engage with the authorities on FinTech-related issues and seek clarification on licensing and regulatory requirements.

In China, which has quite a permissive regulatory framework and therefore, **1.41** arguably, does not need a regulatory sandbox approach, authorities have introduced a range of *regulatory pilot projects* tied to liberalising the country’s financial markets and improving financial access. For example, the China Insurance Regulatory Commission (CIRC), the country’s insurance regulator, has introduced a two-year pilot project designed to give insurance companies the regulatory room to offer services and products across city and state lines. Starting from February 2017, the CIRC lets insurance companies based in any of Beijing, Tjianjin or Hebei to conduct business across these regions. The objective of the pilot is to encourage insurance companies to set up shop in Tianjin or Hebei, where costs are lower than in Beijing, and to sell their services into Beijing and elsewhere within the permitted zone. The pilot illustrates the regulator’s attempt to test-run regulatory innovations within a controlled setting.³⁶

4. RegTech

RegTech is generally defined as the adoption of new technologies to facilitate **1.42** more efficient and effective delivery of regulatory requirements. Over the past ten years, financial institutions have faced an ever-increasing regulatory burden. The cost of compliance has skyrocketed for many financial institutions, particularly global institutions needing to comply with regulatory requirements across jurisdictions. The growing cost of compliance (particularly since the introduction of such financial regulations as GDPR, PSD2, the Markets in Financial Instruments Directive II/Markets in Financial Instruments Regulation).³⁷

36 See, e.g., China: Pilot programme for insurance company and agency cross-regional business, available at: <https://www.lloyds.com/market-resources/market-communications/regulatory-communications/regulatory-communications/regulatory-news-articles/2017/03/china-pilot-programme-for-insurance-company-and-agency-crossregional-business>, and Brummer and Yadav, *supra* note 5, at 46–7.

37 KPMG, The Pulse of FinTech 2018, Biannual global analysis of investment in fintech (July 2018), at 6.

- 1.43** Most existing RegTech solutions operate along one or both of these dimensions: reducing the cost of compliance via automation, or leveraging technology to increase the effectiveness of compliance (e.g., by accessing broader data sets or employing better data analytics). According to the Institute of International Finance, this wave of RegTech innovation ‘stands out from other software solutions by linking advanced models and algorithms, machine learning and advanced analytics, and real-time capabilities’.³⁸ Moreover, unlike FinTech’s inherently financial focus, RegTech’s applications span many regulatory contexts, including monitoring companies’ compliance with environmental regulations and real-time tracking of the location of airlines, to name but two simple examples of how technology could be used to improve not only regulation but also the regulated industry itself.³⁹
- 1.44** In addition to helping companies with their compliance processes, RegTech solutions can also help regulators explore leveraging new compliance software and surveillance tools to evaluate compliance with regulatory requirements. Increasingly, regulators are also starting to embrace the notion that blockchain has wider applications than cryptocurrencies, including the potential to provide greater transparency, innovative ways to solve problems and increased access for citizens. Particular areas of regulatory focus include developing new ways to manage and track physical and digital assets, record internal transactions and verify identities.
- 1.45** Excessive or indiscriminate reliance on RegTech solutions may, however, create new problems and could potentially cause system wide disruptions. For example, if multiple financial institutions rely on a single firm providing such solutions or on a single regulator to aggregate the data, this entity could be subject to a cyberattack or a malfunctioning of the underlying technology.⁴⁰
- 1.46** In sum, the pace of technological development and its applications to financial services have increased dramatically. It is critical that financial regulators stay abreast of developments and establish mechanisms for adopting appropriate regulation and guidance accordingly without stifling innovations that require time to mature. Regulators must be more agile than in the past in order to successfully uphold their missions without creating unnecessary barriers to innovation. This requires principles- and performance-based regulation that enables the private sector to adopt innovative, technology-based compliance

38 Institute of International Finance, *RegTech: Exploring Solutions to Regulatory Challenges*, 29 October 2015, available at: <https://www.iif.com/topics/regtech/regtech-exploring-solutions-regulatory-challenges>.

39 Douglas W. Arner et al., *supra* note 3, at 10.

40 International Monetary Fund Staff Discussion Note, *Fintech and Financial Services: Initial Considerations*, SDN/17/05 (June 2017), at 18.

solutions. In addition, regulators need to understand technology on the same timeline as business. To do this, financial regulators need to engage with the private sector to test and understand new technologies and innovations as they arise.⁴¹

As FinTech continues to blossom, its impact will arguably creep into various legal disciplines, just as the internet became an integral part of the modern-day law practice. As is happening now, more and more clients will demand sophisticated legal advice related to their complex use of FinTech products to evolve their businesses.⁴² Moreover, it is quite probable that the software and database tools that lawyers use in their practices will incorporate blockchain technology, so the way that legal services are provided will inevitably change. For example, drafting of contracts with a simple ‘if this, then that’ logic may be somewhat displaced by blockchain-based smart contracts. In addition, lawyers may soon be confronted with more clients with issues arising from the use of blockchain. The creation of courts such as the Intellectual Property Enterprise Court and the Technology and Construction Court, both in the UK, demonstrates the need for lawyers with specialist knowledge to respond to the growing number of technology-related disputes.⁴³ **1.47**

Finally, lawyers will likely be required to work more closely with technologists and/or have some basic understanding of programming skills in order to be able to verify that contractual terms expressed in a computer code accurately reflect the natural language contract. This trend is already evident with law firms around the globe developing innovation labs and in-house technology for the legal sector in order to boost their competitive advantage against other firms.⁴⁴ **1.48**

E. CONCLUSION

There is a lot of excitement when it comes to FinTech. After all, it erodes intermediation and financial supply chains, introduces a cast of new characters and leaves familiar financial functions to be performed by sophisticated **1.49**

41 US Department of the Treasury, *A Financial System That Creates Economic Opportunities: Nonbank Financial, Fintech, and Innovation* (July 2018), at 170–71.

42 International Bar Associate Legal Policy & Research Unit Legal Paper, *Rule of Law Versus Rule of Code: A Blockchain-Driven Legal World* (November 2017), at 42.

43 *Ibid.*, at 38.

44 See, e.g., Allen & Overy, *Second Group of Tech Companies Confirmed to Join Fuse in May* (April 2018), available at: <http://www.allenoverly.com/news/en-gb/Pages/Second-group-of-tech-companies-confirmed-to-join-Fuse-in-May.aspx>.

algorithms. Proponents believe that FinTech will fundamentally change and improve finance. One very obvious improvement, that every industry disrupted by technology has seen, is the lowering of costs and improvement of services. The other improvement that we are likely to see is better, data-driven decision making. Technology companies are able to identify better loan prospects based on algorithms driven by millions of data points. This is effectively able to overcome human bias and prejudice.

- 1.50** FinTech is still in its nascent stages, however. The disruptions caused by FinTech in the banking and finance sector pose a substantial risk to incumbent banking and finance service providers, but where there is risk there are also opportunities. The way regulators respond will have a heavy bearing on the shape of FinTech in the years ahead. In-house legal departments will need to cast a gimlet eye on the intricate requirements and jurisprudential uncertainty that attend this infant dynamic. The industry is changing rapidly, and shrewd businesses and lawyers alike will want to stay informed in order to stay at the forefront of their markets. Those that do not will lose out on opportunities, customers and market share.