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Global challenges and regulatory strategies to fintech

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Global Challenges and Regulatory Strategies to Fintech[1]

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ABSTRACT

The rise of new technologies has changed the operation, regulation and supervision of financial markets, bringing new challenges and opportunities for consumers, regulators, and financial institutions. This Article seeks to explore the most common regulatory strategies used by financial regulators around the world to address the challenges associated with the rise of fintech. These strategies include the imposition of bans, regulatory passivity, adoption of new legislation, permission on a case by case basis, and more interactive approaches such as innovation offices, accelerators and sandboxes. This Article argues that the adoption and desirability of each regulatory approach will depend on a variety of country-specific factors, including the goals and priorities of the regulator and the particular features of a country. Thefore, there are no one-size-fits-all solutions that can be suggested to promote financial innovation and effectively address the challenges generated by the rise of new technologies in the financial services industry.

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1. CONCEPT AND EVOLUTION OF FINTECH

Since the 2008 global financial crisis, new actors and technological developments and applications began to appear as a result of several factors, including the inability of many companies to raise finace, and the disappointment of many consumers with the traditional financial system. Additionally, in the last decades, many factors such as the exponential increase in the level of mobile and internet penetration[4], improvement in bank infraestruture[5], use of alternative data[6], non-financial companies entering in the financial services industry[7], and expectations from millennials and digital natives[8] are

[4] Over the last decade, there has been a significant rise in access to and speed of the internet worldwide (from 361 million users in 2000 to 4648 million users in 2020). This is a prerequisite from an infrastructural standpoint to access Fintech services. In addition, the cost of internet usage has dropped significantly in the past five years, resulting in an increase in the number of internet users. This, in turn, contributes to Fintech adoption. The increasing penetration of smartphones is also a determinant factor in fintech adoption. See Price Waterhouse Coopers & The Associated Chambers of Commerce of India, "Emerging technologies disrupting the financial sector" (2019), available at: https://www.pwc.in/assets/pdfs/consulting/financial-services/fintech/publications/emerging-technologies-disrupting-the-financial-sector.pdf
See also Internet World Stats, "Usage and population statistics" (2020), available at: https://www.internetworldstats.com/emarketing.htm

[5] In some regions such as Africa and some countries in Latin America, the unbanked population through the traditional financial system is still high due to, among other reasons, vast rural areas that not only don't have access to bank branches but they are also characterized by poor transportation infrastructure, which results to the region's large unbanked population. For example, according to World Bank statistics, in Sub-Saharan Africa there are only 4.5 bank branches per 100,000 people, while in the United States the amount of branches is about 7. These circumstances are a market opportunity for technology-driven products in this areas. They have the ability to fill the gaps of the traditional financial system. See International Monetary Fund and World Bank, "Fintech: The experience so far" (2019), available at: http://pubdocs.worldbank.org/en/361051561641115477/pdf/Fintech-executive-summary.pdf

[6] Nontraditional alternative data have been increasingly used by fintech lenders. For instance, in the United States, e use of alternative data has allowed some borrowers who would have been classified as subprime by traditional criteria to be slotted into ?better? loan grades, which allowed them to get lower priced credit. See Julapa Jagtiani & Catharine Lemieux, *The Roles of Alternative Data and Machine Learning in Fintech Lending: Evidence from the LendingClub Consumer Platform*, Working Papers 18-15, Federal Reserve Bank of Philadelphia (2018), available at: https://www.philadelphiafed.org/-/media/research-and-data/publications/working-papers/2018/wp18-15r.pdf .

[7] Traditional financial institutions continue to play a significant role in personal finances for the time being worldwide. However, for standard transactions and payments, current accounts or other services that get used everyday, new competitors in the market are making a compelling argument for customers to switch or complement traditional services with fintech. It is a space that has attracted interest from some of the giants in the technology industry, or the so-called bigtechs, telecommunication companies, and entrepreneurs. See Callum Glennen, "Non-bank financial institutions are disrupting financial services", World Finance (2017), available at: https://www.worldfinance.com/banking/non-bank-financial-institutions-are-disrupting-financial-services

[8] "Millennials" are defined as the generational cohort born between the early 1980s and late 1990s. "Digital natives" refers to those consumers who grew up with digital technologies. These two generations are highly interconnected with technology and expect services – including financial services – to provide a better costumer experience, meaning that their expectations regarding convenience, speed and cost of financial services are increasingly important. See Financial Stability Board, "Financial Stability Implications from FinTech: Regulatory and Supervisory Issues that Merit Authorities' Attention" (2017), available at: https://www.fsb.org/wp-content/uploads/R270617.pdf

contributing to the rise of financial technologies.[9] The emergence of new technologies promised to revolutionize the world of traditional finance.[10] It was then when the word "fintech", derived from financial technology, started to become popular.[11]

The term fintech refers to "technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services".[12] Therefore, as shown in figure 1, fintech encompasses the use of technologies to promote new or innovative financial products and services. This can be related to both new and traditional areas within finance, such as payments, advice or investment services, fundraising methods, credit scoring, client profiling, and new forms of marketing, among others. Therefore, fintech is no more than than the use of technology in the financial sector, provided these technogical developments create a material effect on the actors, infrastructure and services provided in the financial industry.

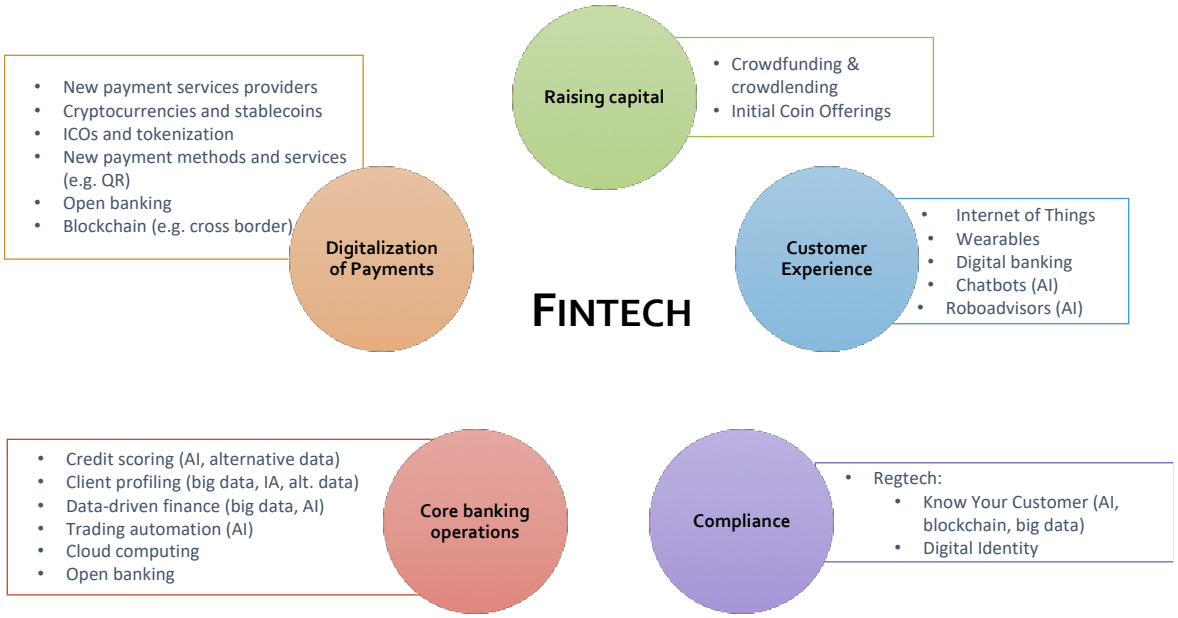
Graph 1. Concept and scope of fintech

[9] Jon Frost, *The economic forces driving fintech adoption across countries* (2020) Bank for International Settlements Working Papers No. 838, available at: https://www.bis.org/publ/work838.pdf

[10] Emerging technologis changed, and will continue to do so, the way financial services operate. Financial organizations are trying to catch up by incorporating artificial intelligence, blockchain, and other technology to benefit their customers, remain competitive and improve business results. See Bernard Marr, ¨The 7 Biggest Technology Trends To Disrupt Banking & Financial Services In 2020¨ (2020) Forbes, available at: https://www.forbes.com/sites/bernardmarr/2019/11/08/the-7-biggest-technology-trends-to-disrupt-banking--financial-services-in-2020/#6496cef62c42 (Last visit: 21 July 2020); Tadd Morganti, "Digital Tech Poised to Revolutionize Financial Reporting" (2020), The Wall Street Journal, available at: https://deloitte.wsj.com/cio/2019/09/05/digital-technology-poised-to-revolutionize-reporting/ (Last visit: 10 Jul 2020); Brian Brody, "The future of lending: how technology continues to shape the finance industry" (2019) Fintech Magazine, available at: https://www.fintechmagazine.com/fintech/future-lending-how-technology-continues-shape-finance-industry (Last visit: 20 July 2020).

[11] For an analysis of the concept and evolution of fintech, see Arner, Douglas W., Janos Barberis, and Ross P. Buckley, *The Evolution Of Fintech: A New Post-Crisis Paradigm?* Georgetown Journal of International Law, 47 (2016): 1271-1319. See also Chris Brummer, *Fintech Law in a Nutshell* (Minnesota, U.S.: West Academic Publishing, 2019).

[12] Financial Stability Board, "Financial Stability Implications from FinTech: Regulatory and Supervisory Issues that Merit Authorities' Attention" (2017), available at: https://www.fsb.org/wp-content/uploads/R270617.pdf



Source: authors

Even though the term "fintech" became popular recently, the evolution of the financial sector has always been closely related to the rise of new.[13] For instance, in 1970, the first electronic ATMs appeared.[14] Some consider ATMs the most important invention in the financial system in the last 30 years.[15] By the time ATMs were broadly implemented, some people started to think about the consequences of such changes in the financial industry, particularly whether ATMs were going to cause a drastic decrease in bank branches and a loss of jobs caused by the replacement of human tellers.[16] Nonetheless, since 2000, not only have teller jobs increased, but they have been growing a bit faster

[13] Arguably it started in 1866 with the Transatlantic cable.
See also Douglas, John L. and Grinberg, Reuben. 2017. "Old Wine in New Bottles: Bank Investments In Fintech Companies," Review of Banking and Financial Law 36: 667-711.

[14]The first ATM appears in 1939 in New York. It is used by the City Bank of New York, although it is withdrawn from traffic for lack of acceptance and use after 6 months of being available to the public. Subsequently, in 1967 Barclays made an ATM available to its customers at the Enfield Town bank branch in North London. A couple of years later, ATMs appear in other European countries and reappear in the United States. It is estimated that currently there can be one ATM for every 3,000 people in the world. See Bernardo Batiz-Lazo and Robert J.K. Reid, "Evidence from the Patent Record on the Development of Cash Dispensing Technology" (2008) Munic Personal RePec Archive Paper No. 9461, available at https://mpra.ub.uni-muenchen.de/9461/1/MPRA_paper_9461.pdf.
An ATM is a vending machine used to withdraw money using a plastic card with a magnetic stripe or a chip (for example, debit card or credit card), without the need for the presence of bank staff. They usually have a small matrix printer or thermal printer to print the supports of the operation and update the clients' savings books.

[15] See Paul Volcker, "The only thing useful banks have invented in 20 years is the ATM" (2009) New York Post available at http://nypost.com/2009/12/13/the-only-thing-useful-banks-have-invented-in-20-years-is-the-atm/.

[16] See James Pethokoukis, What the story of ATMs and bank tellers reveals about the 'rise of the robots' and jobs (2016) AEI Ideas, available at: http://www.aei.org/publication/what-atms-bank-tellers-rise-robots-and-jobs/ (Last visit: 10 May 2019).

than the labor force as a whole. The impact of the ATM machine was not to destroy tellers, actually it was to increase it.[17]

Another illustration of the close relationship between the evolution of the financial sector and technology developments is the internet. In 1986, the London Stock Exchange went from conducting face-to-face negotiations between brokers to implementing transactions on computers using the internet.[18] Currently, trading systems use algorithms to determine the time, price, quantity and routing of orders.[19] This changed the market dynamics and the challenges regulators face to protect consumers and investors and preserve the stability of financial systems.

Theese examples show that the use of technology in the financial industry, or some of the social and labour challenges generated by the rise of new technologies, is not something new. However, in recent years, new technologies have emerged (e.g. blockchain), and existing technologies (e.g. machine learning) are currently being used for more purposes and applications in the financial services industry. For example, artificial intelligence is being used for credit scoring[20] and asset management,[21] and blockchain is being used as the technological infrastructure needed to exchange cryptocurrencies and raise finance

[17] Basically starting in the mid-1990s, ATM machines came in in big numbers. We have, now, something like 400,000-some installed in the United States. And everybody assumed –including some of the bank managers, at first — that this was going to eliminate the teller job. And it didn't. In fact, since 2000, not only have teller jobs increased, but they've been growing a bit faster than the labor force as a whole. That may eventually change. But the impact of the ATM machine was not to destroy tellers, actually it was to increase it. See "James Bessen on Learning by Doing", The Library of Economics and Liberty, available at: https://www.econtalk.org/james-bessen-on-learning-by-doing/

[18] How Technology has influenced the stock market (2012), available at https://www.computersinthecity.co.uk/how-technology-has-influenced-the-stock-market/ (Last visit: 10 May 2019).

[19] The use of computer algorithms in securities trading, or algorithmic trading, has become a central factor in modern financial markets. The desire for cost and time savings within the trading industry spurred buy side as well as sell side institutions to implement algorithmic services along the entire securities trading value chain. Computer algorithms encompass the whole trading process—buy side (traditional asset managers and hedge funds) as well as sell side institutions (banks, brokers, and broker-dealers) have found their business significantly migrated to an information systems–driven area where trading is done with minimum human intervention. See Peter Gomber & Kai Zimmermann, *Algorithmic Trading in Practice*, in Shu-Heng Chen, Mak Kaboudan, & Ye-Rong Du, *The Oxford Handbook of Computational Economics and Finance* (Oxford University Press, 2018).

[20] Today, lenders increasingly use Big Data and advanced prediction technologies, such as machine-learning, to set the terms of credit. These modern underwriting practices could increase prices for protected groups, potentially giving rise to violations of anti-discrimination laws. See Talia Gillis, "False Dreams of Algorithmic Fairness: The Case of Credit Pricing" (2020), vailable at https://ssrn.com/abstract=3571266

[21] See Blackrock, "Artificial intelligence and machine learning in asset management" (2019), available at: https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-artificial-intelligence-machine-learning-asset-management-october-2019.pdf (Last visit: 15 July 2020).

through Initial Coin Offerings.[22] In addition, new actors are emerging, and traditional financial institutions are more interested in digitizing their operations, services, and products. Some banks even argue they have transformed into technology companies.[23]

This rapid changes in the financial services industry challenge regulators. The increase importance of technology and cyber-physical systems involving entirely new capabilities for people and machines that characterizes the Fourth Industrial Revolution, represents the transition to new systems built on the infrastructure of the previous digital revolution.[24] The speed, scope, impact and emergence of new technologies make that, instead of an extension of Third Industrial Revolution, we refer to the current situation as the Fourth Industrial Revolution.

With the arrival of the Fourth Industrial Revolution, regulators have seen the need to face the challenges posed by the use of new technologies as well as the appearance of new actors, including neo-banks,[25] fintech companies, tech companies providing financial

[22] Blockchain was originally developed as the technology behind cryptocurrencies like Bitcoin. Blockchain as a distributed ledger technology is capable of recording anything of value. Thus, the financial sector, as other industries, is exploring how blockchain can be used to reduce transaction costs. See Alex Tapscott & Don Tapscott, "How Blockchain Is Changing Finance" (2017), Harvard Business Review, available at: https://hbr.org/2017/03/how-blockchain-is-changing-finance (Last visit: 15 July 2020). See also Deloitte, "Crunch Time IV. Blockchain for Finance" (2018), available at: https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Finance/gx-ft-crunch-time-blockchain-finance.pdf For a comprehensive analysis of Initial Coin Offerings from a legal and financial perspective, see Aurelio Gurrea-Martínez & Nydia Remolina, *The Law and Finance of Initial Coin Offerings*, in Chris Brummer (ed.), *Cryptoassets: Legal, Regulatory and Monetary Perspectives* (Oxford University Press, 2019) at 117-155.

[23] While these capabilities are reliant on the technologies and infrastructure of the Third Industrial Revolution, the Fourth Industrial Revolution represents entirely new ways in which technology becomes embedded within societies and even our human bodies. See

[24] See Klaus Schwab, *The Fourth Industrial Revolution* (London, Portfolio Penguin, 2017) at 32. See also Klaus Schwab and Nicolas Davis, *Shaping the Future of the Fourth Industrial Revolution. A Guide to Building a Better World*(London, Portfolio Penguin, 2017) at 65.

[25] Neobanks are entities that usually have a traditional bank behind them, even with physical branches, but have adapted their tools and user interaction to mobile platforms. Therefore, these types of entities generally have bank licenses. Neobanks make extensive use of technology (for example, Application Programming Interfaces or APIs, Big Data, artificial intelligence, blockchain, among others) to offer retail banking services primarily through smartphone applications and internet-based platforms. See Basel Committee on Banking Supervision, "Sound Practices. Implications of fintech developments for banks and bank supervisors" (2018) Bank for International Settlements Publication, available at https://www.bis.org/bcbs/publ/d431.pdf.

The impact of neo-banks varies greatly depending on the jurisdiction. In Europe, the neo-banks are scaling their customer base at an unprecedented rate and taking a big portion of the traditional banks' market share. This trend is evident in the European regions, where UK neobanks have added almost 20 million customers. European neobanks gained more than 15 million customers between 2011 and 2019; by 2023, neobanks are projected to have up to 85 million customers over the age of 14 which is equivalent to 20% of Europe's population. However, the larger the consumer base, the more the losses these banks incur. So, even with a large consumer base and increased popularity over recent years, profitability has been an enormous

services, and traditional financial institutions involved in significant digital transformation processes.[26] Likewise, the Fourth Industrial Revolution has also brought intense competition for technological innovation. This is not only fueling business strategies for participants in financial markets, but also competition among countries that seek to raise their profile as fintech hubs.[27] This trend affects not only developed markets (e.g., United States, United Kingdom, Hong Kong and Singapore), but also emerging economies (e.g., Mexico, Colombia) and small markets from advanced economies seeking to become fintech hubs (e.g., Gibraltar, Malta, and Estonia). This situation is leading to an increasing regulatory competition in which regulators are seeking to encourage financial innovation withough undermining other pillars of financial regulation

challenge for these neo-banks. This trend in number of customers and market shares of neo.banks is not replicated in other jurisdictions such as Canada. Chris Skinner, "Neobanks: are they really challenging?" (2020), available at: https://thefinanser.com/2020/07/neobanking-are-they-really-challenging.html/ (Last visit: 23 July 2020)

[26] Traditional banks and financial institutions, for some years and particularly after the financial crisis, have been aware of the need to improve the digital experience of the clients to whom they offer their services. In 2018, banks globally invested more than $ 9.7 billion to enhance their digital banking capabilities only when it comes to customer service. In other words, this figure does not take into account middle and back office innovation processes (risk management, compliance, operations compliance, accounting, etc.). See Val Srinivas & Angus Ross, "Accelerating digital transformation in banking. Findings from the global consumer survey on digital banking" (2018), available at https://www2.deloitte.com/insights/us/en/industry/financial-services/digital-transformation-in-banking-global-customer-survey.html.

[27] A fintech hub is the focal point for fintech activity within a region. It is the ecosystem that encompasses all the infrastructure, organizations and people within the hub or center, as well as the way in which these elements are organized and related to each other. Centers are often defined as cities, but may be wider regions (eg Silicon Valley), countries or narrower locations (eg Level39 in London). Just as organizations have distinctive features that differentiate them from their competitors and peers, fintech centers possess a set of identifiable and interrelated factors that contribute to the overall success of the center. One of those factors is the regulatory environment. Regulators are called in the fintech era to position themselves within the ecosystem of financial innovation, finding the right balance between protecting the stability of the System and promoting innovation. Regulators are frequently seen trying to position themselves in this regard. For example, see "The race to become Islamic banking's fintech hub. Financial centers in the Middle East scramble to join the fintech wave" (2017) The Economist, available at https://www.economist.com/finance-and-economics/2017/06/01/the-race-to-become-islamic-bankings-fintech-hub; Jamie Lee, Singapore, London in race to be top global fintech hub (2016) The Business Times, available at: https://www.businesstimes.com.sg/banking-finance/singapore-london-in-race-to-be-top-global-fintech-hub; Yanin Alfaro, "México se convertirá en el hub de fintech en América Latina. Una vez que entre en vigor la Ley Fintech habrá una explosión en la inversión de tecnologías financieras" (2017) Entrepreneur, available at https://www.entrepreneur.com/article/306044; "Nace Spain Fintech Hub, una iniciativa para fomentar la innovación en el sector financiero" *(*2014) Intereconomia, available at https://intereconomia.com/noticia/nace-spain-fintech-hub-una-iniciativa-para-fomentar-innovacion-sector-fin-20140304-0000/. For an analysis of how financial regulators can build fintech hubs, see Ross P. Buckley, Douglas W. Arner, Robin Veidt & Dirk A. Zetzsche, *Building FinTech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond*, University of Hong Kong Faculty of Law Research Paper No. 2019/100, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3455872.

such as consumer and investor protection, market integrity and the stability of the financial system.[28]

2. DIFFERENT REGULATORY APPROACHES TO FINTECH

Financial regulators worldwide are adopting different regulatory strategies to promote financial innovation and address the challenges generated by the rise of fintech.[29] Namely, some regulators have departed from traditional regulatory strategies and they seek to find more innovative approaches to balance the risks and benefits of technological innovation in the financial industry.[30] Through these new approaches, regulators seek to promote financial innovation without compromising the protection of consumers and investors, as well as the confidence and stability of the financial system.[31] However, achieving this balance is not always easy. In fact, some authors even argue that it is impossible to promote various simultaneous goals such as innovation, market integrity and the enacmtnet of clear rules for the financial services industry.[32]

The following sections will analyze difference regulatory strategies to fintech, and how the desirability of a regulatory approach depends on a variety of factors, including the types of fintech subindustries to be regulated (e.g., crptoassets, digital payments), the particular features of the country, and the goals and priorities of financial regulators.[33]

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[28] In a similar way, see Fernando Restoy, "Regulating fintech: what is going on, and where are the challenges?", speech at th ASBA-BID-FELABAN XVI Banking public-private sector regional policy dialogue "Challenges and
opportunities in the new financial ecosystem", Washington DC, 16 October, available at: https://www.bis.org/speeches/sp191017a.pdf; See also Johannes Ehrentraud, Denise Garcia Ocampo, Lorena Garzoni & Mateo Piccolo, *Policy responses to fintech: a cross-country*, FSI INSIGHTS ON POLICY IMPLEMENTATION NO 23 (2020), available at https://www.bis.org/fsi/publ/insights23.pdf.

[29] For a fantastic overview of these approaches, see Johannes Ehrentraud, Denise Garcia Ocampo, Lorena Garzoni & Mateo Piccolo, *Policy responses to fintech: a cross-country*, FSI INSIGHTS ON POLICY IMPLEMENTATION NO 23 (2020), available at https://www.bis.org/fsi/publ/insights23.pdf.

[30] See Basel Committee on Banking Supervision, "Sound Practices. Implications of fintech developments for banks and bank supervisors"(2018) Bank for International Settlements Publication), available at https://www.bis.org/bcbs/publ/d431.pdf.

[31] Some regulators may have other mandates. This is the case of the Financial Conduct Authority of the United Kingdom that has a statutory competition enhancing mandate. When the FCA was created in 2013, we were given an objective to promote effective competition in consumers' interests in regulated financial services. See Financial Conduct Authority, "Promoting Competition", available at: https://www.fca.org.uk/about/promoting-competition (Last visit 22 July 2020)

[32] Chris Brummer & Yesha Yadav, "Fintech and the Innovation Trilemma*"*, 107 GEORGETOWN LAW JOURNAL 235 (2019).

[33] Emphasizing the regulatory challenges raised by divergences in national legal systems, administrative processes, and market structures, see Yesha Yadav, "Fintech and International Financial Regulation" (2020) 53 Vand.J.Trans.L. 1109.

Therefore, there are no one-size-fits-all solutions that can be suggested to optimally address the challenges associated with the rise of fintech.[34]

2.1. Prohibition

A possible regulatory response to the rise of fintech may consist on the imposition of bans. According to this approach, a certain product or fintech activity is prohibited by the regulator. This regulatory model can be adopted for several factors, including fear about the potential risks generated by the use of new technologies, and the inability of the existing regulatory framework to effectively address those risks.[35] Another possible explanation for the adoption of a prohibitive model may consist of the lack of sources or sophistication of the regulator.[36] These latter factors may make the regulator less capable of accurately assessing the costs and benefits of a technology, leading to suboptimal regulatory strategies.[37]

China and South Korea can be included among those regulators that, as a result of the fear associated with various fintech activities, have adopted a prohibitive model for some activities and fintech subindustries.[38] In the case of China, the growth and rapid expansion of cryptocurrency mining[39] has given this country an important influence on the development of blockchain.[40] This technology is strategic for the country and is included in the five-year plan of the Communist Party, since Beijing has recognized its advantages and potential.[41] Namely, they considered blockchain technology a tool that will allow the

[34] See Nydia Remolina, "Contextualizing Regulatory Sandboxes in Latin America" (2019), available at https://fintechpolicy.org/2019/01/20/contextualizing-regulatory-sandboxes-in-latin-america/.
[35] These risks may include lack of consumer and investor protection, risk of money laundering and terrorist financing, cybersecurity, and even financial stability and public confidence.
[36] By sophistication we mean the ability to tackle complex issues cnad challenges as for example, those that come with the use of emerging technologies and the innovation in financial products. The lack of understanding of new products and how they work might rely on the unpreparenedness of the regulator. This is an important risk in financial regulation that might lead to something called "regulatory capture by sophistication" which leads to poor performance and inneficient regulatory decisions. See Hendrik Hakenes and Isabel Schnabel, "Regulatory Capture by Sophistication" (2014), vailable at: https://ssrn.com/abstract=2531688.
[37] Ibid.
[38] These prohibitions are imposed, for example, in the industry of cryptoassets. See Aurelio Gurrea-Martínez & Nydia Remolina, *The Law and Finance of Initial Coin Offerings*, in Chris Brummer (ed.), *Cryptoassets: Legal, Regulatory and Monetary Perspectives* (Oxford University Press, 2019) at 130-132.
[39] Emily Parker, "Can China Contain Bitcoin?" (2017) MIT Technology Review, available at https://www.technologyreview.com/s/609320/can-china-contain-bitcoin/
[40] For an analysis of the concept, applications and characters of blockchain, see chapter 1 of this work.
[41] See National Development Reform Commission (NDRC) People's Republic of China, "National Development and Reform Commission held a press conference in April Introduce macroeconomic

country to advance their regional interests especially in commerce.[42] However, in February 2018, China decided to impose a ban on Initial Coin Offerings by adding international cryptocurrency exchanges[43] to its "Great Firewall."[44] Additionally, in early 2019, the Chinese cybersecurity and internet regulator, the Cyberspace Administration of China, published a prohibitive regulation of anonymity, thus hindering many public blockchain use cases.[45] In our view, this prohibitive approach is probably explained by the fear faced by Chinese regulators due to the size of the cryptomakert, the inadequacy of the current frameworks, and the unfortunate experiences they had in the past with more permissive approaches.[46]

In South Korea, Initial Coin Offerings are also prohibited.[47] Before the rise of this fundraising mechanism, especially in 2017 and 2018, the use of bitcoins for payments, transfers and transactions was legalized.[48] South Korea's legalization of cryptocurrencies sparked crypto investments in Asia, and positioned South Korea as the world's third largest crypto market.[49] However, when observing the high costs of cryptocurrency

operations and respond to hot issues" (2020), available at: https://www.ndrc.gov.cn/xwdt/xwfb/202004/t20200420_1226031.html (Last visit: 19 July 2020)

[42] Wharton, University of Pennsylvania, "China's Blockchain Dominance: Can the U.S. Catch Up?" (2019), available at https://knowledge.wharton.upenn.edu/article/can-u-s-catch-chinas-blockchain-dominance/.

[43] These exchanges are the markets where cryptocurrencies are traded.

[44] The Great Firewall of China is officially called the Golden Shield Project and involves Internet censorship and surveillance by the Chinese Ministry of Public Security (MPS). The project started in 1998 and began operations in November 2003. See Harsch Taneja & Angela Xiao Wu, "Integrating Access Blockage with Cultural Factors to Explain Web User Behavior: The Case of China's Great Firewall" (2014)The Information Society 297, available at https://www.tandfonline.com/doi/abs/10.1080/01972243.2014.944728.

[45] The regulation is applicable to companies that have websites or mobile applications and that provide information and technical support to the public using blockchain. What the standard seeks is that these companies register their names, domains and server addresses in the registry that for this purpose will be carried by the internet and cybersecurity authority. The rule also states that companies that work with blockchain allow authorities to access the data stored in the distributed database and that they introduce registration procedures that require their users to have an identification card or mobile phone number. Furthermore, they will be required to monitor content and censor information that is prohibited by current Chinese law. See http://www.cac.gov.cn/. English translation available at Robert Schwertner, "Does China ban Cryptocurrencies?" (2019), available at https://cryptorobby.blog/2019/01/11/does-china-ban-cryptocurrencies/.

[46] In the context of crowdlending, for example, China adopted a very permissive approach. However, this approach turn out to be a failure, generating numeruous scams and financial scandals. For an analysis of the problems and evolution of crowdlending regulation in China, see Hui Huang, "Online P2P Lending and Regulatory Responses in China: Opportunities and Challenges" (2018) 19 EBOR 63.

[47] Yogita Khatri, South Korea Will Maintain ICO Ban After Finding Token Projects Broke Rules (2019) CoinDesk, available at https://www.coindesk.com/south-korea-will-maintain-ico-ban-after-finding-token-projects-broke-rules.

[48] See Carlos A. Arango-Arango, María M. Barrera-Rego, Joaquín F. Bernal-Ramírez & Alberto Boada-Ortiz, "Criptoactivos" (2018) Banco de la República de Colombia Documentos Técnicos o de Trabajo, available at: http://www.banrep.gov.co/es/publicaciones/documento-tecnico-criptoactivos.

[49] *Ibid.*

exchanges in the country,[50] the excessive speculation in cryptoassets, the international fall in prices in 2018, and the hacks that took place in various cryptocurrencies exchanges in South Korea, the country adopted more restrictive measures. Among them, the South Korean Financial Services Commission decided to ban initial coin offerings.[51]

In any case, it should be kept in mind that even if a country adopts a prohibitive model, these prohibitions are often limited, and they may even differ across *fintech subindustries.* For example, the same regulator may restrict certain types of fintech subindustries (e.g., cryptocurrencies, ICOs) and promote others (e.g., digital payments).[52] In other countries, the restrictions do not focus on subindustries but on certain *actors.* For example, in the area of cryptoassets, the United Kingdom regulator – the Financial Conduct Authority – has proposed to ban the purchase and sale to retail consumers of derivatives that reference certain types of cryptoassets.[53] This regulatory response is probably explained by the greater risks and information asymmetries faced by retail consumers, especially in the context of complex and volatile products such as cryptoassets, where there is also a high risk of scams.[54]

Likewise, the Financial Superintendence of Colombia prohibited financial entities from custodying, investing, intermediating and operating with cryptocurrencies.[55] In this

[50] Besides collecting fees for trading and transferring money, many crypto exchanges also charge fees to list coins. South Korean exchanges are known for charging the "kimchi premium" that corresponds to the gap in cryptocurrency prices in South Korean exchanges compared to foreign exchanges. See Cali Haan, "Report: 97% of Korean Crypto Exchanges Close to Bankruptcy", Crowdfund Insider (2019), available at: https://www.crowdfundinsider.com/2019/08/150763-report-97-of-korean-crypto-exchanges-close-to-bankruptcy/ (Last visit: 19 July 2020).

[51] Yogita Khatri, South Korea Will Maintain ICO Ban After Finding Token Projects Broke Rules (2019) CoinDesk, available at https://www.coindesk.com/south-korea-will-maintain-ico-ban-after-finding-token-projects-broke-rules.

[52] China is a good example of this type of approach. Digital payments are increasingly important in China. In 2016 alone, China saw $9 trillion in mobile payments — in contrast to a comparably small $112 billion of mobile payments in the United States. With the explosive growth in digital payment transactions, the People's Bank of China (PBOC) implemented a new mobile payment regulation on June 30, 2018. See Andrew Liu, "An Analysis of the PBOC's New Mobile Payment Regulation", CATO Institute
In contrast, this jusrisdiction mandates that Financial institutions are prohibited from engaging in Bitcoin-related business activities. See Robin Hui Huang, Demin Yang & Ferdinand Fai Yang Loo, "The Development and Regulation of Cryptoassets: Hong Kong Experiences and a Comparative Analysis", *European Business Organization Law Review volume 21, pages319–347(2020),* available at: https://link.springer.com/article/10.1007/s40804-020-00174-z

[53] See Financial Conduct Authority, Restricting the sale to retail clients of investment products that reference cryptoassets (2019), available at https://www.fca.org.uk/publications/consultation-papers/cp19-22-restricting-sale-retail-clients-investment-products-reference-cryptoassets.

[54] Gurrea-Martínez & Remolina, *supra* note 18 at 131. See also Financial Conduct Authority, "Prohibiting the sale to retail clients of investment products that reference cryptoassets" (2019) Consultation paper, available at: https://www.fca.org.uk/publication/consultation/cp19-22.pdf

[55] Superintendencia Financiera de Colombia, "Criptoactivos" (2018), available at https://www.superfinanciera.gov.co/inicio/criptoactivos-10090492 (Last visit: May 2019).

situation, however, the justification seemed to be based on the fact that cryptocurrencies can be used for money laundering and financing of terrorism.[56] This prohibition was applied by the regulator at a time when Colombia began to appear on the list of most active jurisdictions in Bitcoin transactions.[57] Although this represents only 1.03% of the Bitcoin operations in the world at the time of writing this Article, the figure is relevant if one takes into account that, in terms of Gross Domestic Product, Colombia is ranked 37th in 2018.[58]

There are several advantages associated with adopting a prohitive model. For example, if the regulator does not understand the risks associated with a fintech subindustry, or it finds that the existing regulatory framework does not provide an effective protection to consumers and investors, the imposition of bans may make sense. Besides, these prohibitions can give regulators time to think about the most appropriate regulatory strategy to promote financial innovation without undermining consumer and investor protection, market integrity, and the stability of the financial system.

In addition, this approach could even become an enabler for financial innovation. Indeed, even though "banning to enabling" may sound a bit contradictory, in some cases, it will be necessary for regulators to first isolate market actors from the risks associated with a new technology. Once they can provide an effective response to mitigate those risks, the regulator can then abandon the prohibit approach. Therefore, the imposition of temporary bans can ultimately enhance consumer and investor confidence, facilitating the future development of the industry.

Still, the imposition of bans can generate various costs. First, it would prevent consumers and investors from having access to some financial services that they might not be able to afford otherwise. Therefore, the imposition of bans can harm financial inclusion. Second, from the perspective of firms, when the facts affects fundraising mechanisms (e.g., ICOs), this approach may reduce the number of financing options available to companies.

[56] Superintendencia Financiera de Colombia, "Operaciones con "monedas virtuales" NO se encuentran amparadas por ningún tipo de garantía privada o estatal" (2017), available at https://www.superfinanciera.gov.co/jsp/Publicaciones/publicaciones/loadContenidoPublicacion/id/10089581/dPrint/1/c/00 (last visit, May 2019).

[57] In 2018, Colombia ranked 14 in the list of Bitcoin trading volume by country. See Tom Alford, *Bitcoin Adoption: Trading Volume by Country* (2018), available at: *https://totalcrypto.io/bitcoin-adoption-trading-volume-country/* (last visit, May, 2019).

[58] International Monetary Fund, *World Economic Outlook Database* (2019), available: *https://www.imf.org/external/pubs/ft/weo/2019/01/weodata*

Therefore, it can hamper the ability of many companies to pursue value-creating projects that can ultimately generate jobs and wealth. Third, a prohibitive model would prevent regulators from enjoying some technologies that can enhance their supervisory functions. Finally, the imposition of bans may incentivize many actors to move to other jurisdictions with more friendly regulatory environments, thus reducing the levels of innovation and the creation of job creation in the country. As a result, before adopting a prohibitive approach, either for a particular sub-industry (e.g., cryptoassets) or actors (e.g., retail consumers), regulator should conduct a careful analysis of the potential costs and benefits of this model,[59] and only adopts this approach if, after taking into account the particular features of the country, and the goals and priorities pursued by the regulator, the imposition of bans may be more desirable than other regulatory strategies.

2.2. Regulatory Passivity (or "Doing Nothing")

The second regulatory strategy potentially implemented to deal with the fintech industry may consist of "doing nothing". According to this model, based on the idea of a regulatory passivity, financial regulators would not do anything beyond enforcing the regulatory framework and monitoring the market.

This regulatory model varies across regulators and fintech matters. On the one hand, some regultors use this model with a "*laissez-faire*"[60] scope. Regulators opting for this approach seek to let the fintech industry develop first, and then implement regulation or apply existing regulatory frameworks.[61] An example of this model was used by China prior to 2015.[62] Other regulators, however, have decided *not* to promote specific

[59] By conducting a cost-benefit analysis, we do not necessarrilly mean that this should be done quantitatibly in all cases. Cost-benefit analysis in that sense might be unworkable for certain financial market costs that are unquantifiable, particularly those dealing with systemic risks. Thus, we call this type of analysis to the one that evaluates the trade-offs of of a particular regulatory decisión., See John C. Coates IV, *Cost Benefit Analysis of Financial Regulation: Case Studies and Implications*, 124 YALE LAW JOURNAL 882, 1010-11 (2015). See also Jeffrey N. Gordon, *The Empty Call For Benefit-Cost Analysis in Financial Regulation*, 43 JOURNAL OF LEGAL STUDIES S351, S353, S366-S368 (2014).
However, we must recognize that satisfying one policy goal might make other policy goals more difficult to achieve. Those are precisely the trade-offs that financial regulators would analyze. For more analysis on these trade-offs and how they affect regulation for fintech, see Chris Brummer & Yesha Yadav, "Fintech and the Innovation Trilemma*"*, 107 GEORGETOWN LAW JOURNAL 235 (2019).
[60] See Douglas W. Arner, Janos Nathan Barberis & Ross P. Buckley, "FinTech, RegTech and the Reconceptualization of Financial Regulation" (2016) 37 Nw. J. Int'l L & Bus. 371.
[61] *Ibid.*
[62] *Ibid*, noting the following: "In many ways, this was China's approach until 2015. Because of a number of negative experiences, since the middle of 2015, China has instead focused on implementing a complete regulatory framework for FinTech". (...). "The traditional financial services industry —arguably fearful of

regulatory initiatives for fintech issues, what basically leads to apply the existing framework. Examples of this latter approach include the regulation of cryptoassets in most jurisdictions around the world, including the United States, the United Kingdom, Singapore and Canada. In these jurisdictions, cryptoassets are subject to securities regulation if the cryptoassets issued by the issuers are considered 'securities'. If so, the issuance of tokens will be subject to the regular framework for securities regulation. What some countries have done, however, is claryfing the treatment of cryptoassets by issuing some guidelines.[63] In those cases, however, the regulatory framework remain the same. An exception can be found in Canada though, since the Canadian Securities Administrators (CSA) took jurisdiction over the trading of non-securities on the basis of the relationship between the trading platform and the user forming an investment contract or a derivative.[64]

Finally, this passive regulatory approach may also be adopted even when regulators believe that a new regulatory framework will be needed. In some jurisdictions, regulators prefer to observe what other jurisdictions are doing, and then be in a better position to assess the most appropriate regulatory framework.[65]

The adoption of a regulatory passivity (or "doing nothing") approach to promote financial innovation and address the challenges of the fintech industry may create several

competition from new entrants unhindered by complex and expensive regulatory and compliance requirements— typically argues in favor of similar treatment for all".

[63] This is something that, for example, Switzerland, Singapore and Canada have done in the context of cryptoassets. See FINMA, "Guidelines for enquiries regarding the regulatory framework for initial coin offerings" *(*2018), available at https://www.finma.ch/en/news/2018/02/20180216-mm-ico-wegleitung/; MAS, "Guide to digital token offerings" (2018), available at https://www.mas.gov.sg/~/media/MAS/News%20and%20Publications/Monographs%20and%20Information%20Papers/Guide%20to%20Digital%20Token%20Offerings%20last%20updated%20on%2030%20Nov.pdf.; Canadian Securities Administrators, CSA Staff Notice 46-307, available at: https://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20170824_cryptocurrency-offerings.htm; Canadian Securities Administrators, CSA Staff Notice 46-308, available at: https://www.osc.gov.on.ca/documents/en/Securities-Category4/csa_20180611_46-308_implications-for-offerings-of-tokens.pdf

[64] See Canadian Securities Administrators, "CSA Staff Notice 21-327 Guidance on the Application of Securities Legislation to Entities Facilitating the Trading of Crypto Assets" (2020), available at: https://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20200116_21-327_trading-crypto-assets.htm

[65] These latter international organizations would include with particular relevance the Basel Committee, the International Organization of Securities Commissions (IOSCO), the International Monetary Fund (IMF), the OECD, the World Economic Forum, or the International Stability Council (FSB) , among others. Regulators from different jurisdictions are currently participating in these types of organizations in debates related to how certain issues related to emerging technologies should be addressed from the regulatory point of view. Therefore, under this model, regulators also expect these discussions to take a little more time.

advantages. For example, the evidence shows that allowing the development of the market without regulating new players and products can promote innovation. For instance, Chinese financial regulators originally (before 2015) chose the 'doing nothing' approach for crowdfunding.[66] From 2013 to 2015, this market grew from US$5.56 billion to US$101.7 billion, with the amount of alternative financing in China totaling over US$100 billion.[67] The American and European markets have grown about 480 and 1036 per cent, respectively, while Asia has shown tremendous growth of 2,290 per cent.[68] In Asia, the Chinese market has the fastest annual growth rate of the online alternative financing volume accounting for over 99 per cent of the growth within the Asia-Pacific region.[69] The rapid increase of crowdfunding operations because of the lack of specific regulations for crowdfunding processes enabled platforms to begin their operations very quickly.

However, this strategy causes several problems. Firstly, the lack of regulation (or specific regulation) can leave consumers and other users unprotected, ultimately damaging confidence in the financial system.[70] Secondly, it should be kept in mind that the processes of innovation and digital transformation are carried out by both traditional financial institutions - which are regulated and supervised - and new competitors that might not subject to the same level of regulation and supervision. Therefore, the absence of regulation for actors who develop functionally equivalent activities not only can be unfair, but it can also lead to several issues, including regulatory arbitrage and the lack of

[66] See Tianlong Hu & Dong Yang, "The People's Funding of China: Legal Developments of Equity Crowdfunding-Progress, Proposals, and Prospects" (2014) U.Cin.L.Rev. 448; Lin Lin, "Managing the Risks of Equity Crowdfunding: Lessons from China" (2017) JCLS 327.

[67] Zaiyu Huang, Candy Lim Chiu, Sha Mo & Rob Marjerison, *The nature of crowdfunding in China: initial evidence*, 12 ASIA PACIFIC JOURNAL OF INNOVATION AND ENTREPRENEURSHIP 3, available at: https://www.emerald.com/insight/content/doi/10.1108/APJIE-08-2018-0046/full/html

[68] *Ibid.*

[69] *Ibid.*

[70] These problems usually lead to new frameworks and proposals. In China, for example, the regulator totally changed the regulatory approach – and not only with crowdfunding – and adopted a more intensive regulatory approach. Something similar happened in Canada with the regulatory framework applicable to cryptoasset trading platforms. The CSA Consultation Paper 21-402 which contains a proposed framework for this companies was published as a consequence of he downfall of crypto asset trading platform Quadrigacx. The downfall resulted from a fraud committed by Quadriga's co-founder and CEO Gerald Cotten. See Kevin Helms, "Canadian Regulator Unveils the Truth Behind Collapsed Crypto Exchange Quadrigacx" (2020) News Bitcoin.com, available at: https://news.bitcoin.com/canadian-regulator-collapsed-crypto-exchange-quadrigacx/ (Last visit: 15 July 2020). See also Joint Canadian Securities Administrators/Investment Industry Regulatory Organization of Canada, "Consultation Paper 21-402 Proposed Framework for Crypto-Asset Trading Platforms" (2019), available at: https://www.osc.gov.on.ca/en/SecuritiesLaw_csa_20190314_21-402_crypto-asset-trading-platforms.htm

supervision of activities potentially generating similar risks.[71] Finally, not having a regulatory framework does not always lead to the development of the fintech industry. A lack regulation often generates uncertainty and lack of confidence. And if so, consumers and investors might be discouraged from using the products and services potentially provided by the new market actors.

In any case, in order to assess the effectiveness of the lack of regulation (*laissez faire*), the use of the existing regulatory framework, or even the ues of self-regulation[72], as a regulatory strategy, the particular features of the country will again be incredibly important. For example, in countries where the market is highly sophisticated, as it happens in the United States and the United Kingdom, the threat of being subject to reputational sanctions may incentivize better behaviors from corporate actors. Likewise, in countries with an active market of litigation lawyers and the use of class actions, market actors can be more deterred from enganging in any opportunistic behavior. Therefore, the desirability of this regulatory model will depend on a variety of factors, including the legal, economic and institutional features of the country, as well as the goals and priorities of the financial regulation.

2.3. Permission Case by Case

Some regulators have opted for a regulatory strategy consisting of evaluating products and market participants on a case by case basis. If these actors show that their products need a special treatment, they might get some benefits from the regulator, including a more relaxed supervision. Unlike the sandbox, which involves a close collaboration between innovators and regulators, this permission on a case by case basis does not entail

[71] In fact, the lack of a level playing field for some banking services has increase the relevant of the shadow banking industry. For an analysis of shadow banking, see Eddy Wymeersch, "Shadow Banking and Systemic Risk" (2017) European Banking Institute Working Paper Series No. 1 ,available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2912161; Steven L. Schwarcz, "Shadow Banking and Regulation in China and Other Developing Countries" (2017) Duke Law School Public Law & Legal Theory Series 2017-8 , available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2871297.

[72] Self-regulatory organizations can lead to free-riding, principal-agent, and moral-hazard challenges when institutional arrangements do not provide adequate mechanisms for monitoring and enforcement of rules, particularly in the financial sector. See Andrew Tuch, *The Self-Regulation of Investment Bankers*, 83 GEORGE WASHINGTON LAW REVIEW 101 (2014), available at: https://ssrn.com/abstract=2432601. See also Ryan Clements, *Can a Cryptocurrency Self-regulatory Organization Work? Addressing its promises and likely challenges*, THE FINREG BLOG, GLOBAL FINANCIAL MARKETS CENTER, DUKE UNIVERSITY SCHOOL OF LAW (2018), available at: https://sites.law.duke.edu/thefinregblog/2018/06/21/can-a-cryptocurrency-self-regulatory-organization-work-assessing-its-promise-and-likely-challenges/

the accompaniment of the developer. Instead, it just consists of issuing a statement in which, under certain conditions, the developer of the product is exempted from certain regulatory charges or the possibility of being subject to enforcement actions by the financial supervisor.

In some jurisdictions, such as the United States, this regulatory approach has been adopted through the implementation of "no action letters". One of the first authorities to implement this mechanism was the United States Consumer Financial Protection Bureau.[73] This regulatory agency has issued no action letters to allow certain credit market participants to use alternative data and machine learning to build credit risk models.[74]

The advantages of this regulatory strategy are mainly associated with its speed and reduced costs of implementation. On the one hand, this system allows regulators to facilitate innovation without incurring significant costs since they will ont need hire many employees and make them work closely with entrepreneurs. On the other hand, from the perspective of companies, this system can also be attractive since it may make them reduce compliance costs or, at least, some legal and economic risks associated with lack of compliance with the existing regulatory framework.

Despite these benefits, this regulatory model also presents certain risks. First, the waiver of certain regulations or enforcement actions by the supervisor may harm the protection

[73] The Consumer Financial Protection Bureau is the federal regulatory agency that deals with financial consumer protection issues in the United States. CFPB's jurisdiction includes banks, credit unions, securities firms, payday lenders, mortgage-servicing operations, foreclosure relief services, debt collectors and other financial companies operating in the country. However, state agencies also have a role and jurisdiction for matters within a state. Because of this particular feature of US regulatory architecture, the CFPB is teaming up with several state regulators to launch a network that helps them coordinate better on financial innovation. See Finextra, "CFPB partners state regulators on innovation network" (2019), available at: https://www.finextra.com/newsarticle/34386/cfpb-partners-state-regulators-on-innovation-network
See also Consumer Financial Protection Bureau website, available at: https://www.consumerfinance.gov/ (Last visit: 20 July 2020)

[74] In 2017, the CFPB announced a No-Action Letter to Upstart Network, a company that uses alternative data and machine learning in making credit underwriting and pricing decisions. The No-Action Letter references the application of the Equal Credit Opportunity Act (ECOA) to the lender's use of alternative data and machine learning for its underwriting and pricing model. This No-Action Letter is specific to the facts and circumstances of the recipient and does not serve as an endorsement of the use of any particular variables or modeling techniques in credit underwriting and pricing. See Patrice Alexander Ficklin & Paul Watkins, "An update on credit access and the Bureau's first No-Action Letter" (2019), CFPB Blog, available at: https://www.consumerfinance.gov/about-us/blog/update-credit-access-and-no-action-letter/
See also Consumer Financial Protection Bureau (CFPB), Policy on No-Action Letters Policy (2019), available at: https://files.consumerfinance.gov/f/documents/cfpb_final-policy-on-no-action-letters.pdf

of consumers and investors. Secondly, this regulatory approach may not be transparent enough. Indeed, since there are not any clear guidelines provided *ex ante*, and the assessment is usually made on a case by case basis, market participants might not be able to know how regulators are assessing each case. Thirdly, as a result of the possibility of applying different rules to functionally equivalent actors or products, the use of this approach may increase the risk of regulatory arbitrage.[75] Fourth, the success and credibility of this strategy and, in general, of those that involve some type of monitoring or authorization by the supervisor, largely depends on having independent and sophisticated financial authorities. Therefore, these types of approach will not be desirable in countries with unsophisticated regulators. Finally, since this approach does not make the regulator work closely with the developers through all the stages of the project, this system does not allow the regulator to learn from innovators. Therefore, not only it may hamper the ability of the regulator to implement more appropriate regulation in the future, but it also hampers its ability to effectively supervise financial markets with changing actors and business models. Precisely, in order to solve this latter problem, some financial regulators have decided to implement more 'interactive approaches', consisting of facilitating collaboration between innovators and regulators. As it will be examined, these interactive approaches include from accelerators and innovation offices, as the simplest forms of collaboration, to the use of sandboxes, which is the most intensive form of interaction.

2.4. Interactivity

As an alternative approach, regulators may choose to interact with innovators. For that purpose, the primary regulatory strategies used across jurisdictions have been the use of innovation offices, accelerators and sandboxes.

2.4.1. Innovation offices

Some countries have decided to implement innovation offices as a first step to interact more closely with the fintech industry. Although the denomination of these offices varies across jurisdictions, they all have a similar objective, identified with promoting

[75] Inconsistency in discretionary relief hasn't been the case with respect to the CSA sandbox decisions which takes a case by case approach to exemptive relief. See https://www.securities-administrators.ca/industry_resources.aspx?id=1626

interaction between regulators and innovators and, by doing so, facilitating mutual learning. Under this model, regulators increase their knowledge on financial technology and new business models in technology-based companies. Thus, they will be in a better position to regulate and supervise financial markets. At the same time, developers have the opportunity to solve their doubts about the regulatory framework applicable to their products. Therefore, it can be a mutually beneficial regulatory model. Currently, there are 33 jurisdictions with operating innovation offices.[76]

These innovation offices are relatively easy and affordable to implement.[77] They do not require prior regulatory development and they can start as small teams within the regulator or supervisor.[78] These innovation offices can choose to offer a permanent space for interaction, or they can designate spaces for customer service where they can interact with innovators. For example, the LabCFTC of the United States Commodity Futures Trading Commission (CFTC) is an innovation office with specific business hours. In fact, the CFTC team that belongs to the innovation office not only works from Washington DC, headquarters of the CFTC, but also travels around the country opening these interaction spaces for specific days.[79]

Since innovation offices are not usually regulated, the criteria for interacting with them are not always public. However, taking into account data published by some regulators and supervisors, these typically include advisory and support services to innovators, financial inclusion goals, and the promotion of consumer awareness and protection.[80] Some regulators require that innovators ensure that they have already studied all the risks

[76] UNSGSA FinTech Working Group and CCAF (2019); European Supervisory Authorities (2019).
[77] See Ross P. Buckley, Douglas W. Arner, Robin Veidt & Dirk A. Zetzsche, *Building Fintech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond*, 61 WASHINGTON UNIVERSITY JOURNAL OF LAW AND POLICY 56, (2020).
[78] The Financial Technology Enabler Group (FTEG) of Bank Negara of Malaysia (BNM) is an example of this growth and different stages of development of innovation offices.
[79] For a deeper analysis, see LabCFTC, "Announcing LabCFTC Office Hours" (2018), available at https://www.cftc.gov/sites/default/files/2018-09/labcftc_officehours102318.pdf.
[80] Monetary Authority of Singapore & University of Cambridge´s Centre for Alternative Finance, "Early Lessons on Regulatory Innovations to Enable Inclusive FinTech: Innovation Offices, Regulatory Sandboxes, and RegTech" (2018), available at https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-early-lessons-regulatory-innovations-enable-inclusive-fintech.pdf.

associated with their innovative project and know how to manage and mitigate them, before consulting with the innovation offices.[81]

Innovation offices can contribute to financial innovation at a relatively low cost. Actually, as they do not involve many resources, they can reach a large population without a significant investment. The reduced costs of this regulatory strategy along with its interactive nature probably explains part of the success of this model. For example, the innovation office of the UK Financial Conduct Authority (FCA) has served over 600 companies, many of which have subsequently applied for some form of financial license.[82] This number far exceeds the number of innovation projects that are developed in the FCA sandbox. The same trend is repeated in other jurisdictions, where the results of the innovation office are, in terms of number of projects, more significant than those presented by the sandbox. By December 2018, the number of companies that used sandboxes was approximately 100 worldwide.[83] Against this figure, it is noteworthy that, the Dutch innovation office has supported 600 companies,[84] the Monetary Authority of Singapore has supported more than 500,[85] and the CFTC more than 200.[86]

2.4.2. Accelerators

Some regulators have also chosen to implement accelerators or incubators, which are an additional layer of interaction compared to innovation offices. Accelerators typically provide advice and monitoring to entrepreneurs. An example of an accelerator was created by the Monetary Authority of Singapore through the Global Fintech Hackcelerator.[87] Another example is the Fintech Hive organized by the Dubai International Financial Center.[88] Accelerators are less common than sandboxes or

[81] Examples: Bahrain (CBB), Cyprus (CySEC), Estonia (EFSA), Hong Kong (HKMA), Malaysia (BNM), Singapore (MAS), US (CFPB). See https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-early-lessons-regulatory-innovations-enable-inclusive-fintech.pdf.
[82] Monetary Authority of Singapore & University of Cambridge´s Centre for Alternative Finance, *supra* note 78.
[83] *Ibid*.
[84] *Ibid*.
[85] *Ibid*.
[86] *Ibid*.
[87] See https://www.fintechfestival.sg/global-fintech-hackcelerator
[88] See https://FinTechhive.difc.ae/

innovation offices.[89] This is probably due to the fact that, in addition to involving greater resources, appointing a person to "mentor" entrepreneurs require people with high level of expertise, and many countries around the would do not have sophisfisticated regulators. So far, only eight jurisdictions have implemented accelerators: Singapore, Abu Dhabi, Bahrain, Dubai, France, Hungary, Portugal, and South Korea.[90]

2.4.3. Sandboxes

Sandboxes are probably the most popular form of interactive approach to deal with the fintech industry.[91] The term 'sandbox' comes from the technology sector, where a "sandbox" represents an isolated testing environment to monitor new software or processes. In the field of financial regulation, the term sandbox is being used with a similar meaning. Namely, a sandbox is a regulatory strategy to promote financial innovation that consist of providing a testing environment where innovators can develop their products under the close supervision of the regulators and usually benefiting from a lower regulatory burden during the testing period.[92]

Currently, more than 50 jurisdictions around the world have implemented sandboxes.[93] From the analysis of the different models of sandboxes used in the international community, it can be seen that, according to the objectives pursued by the sandboxes, there are at least four types of sandboxes: (i) sandboxes mainly designed to test and develop new products by relaxing the regulatory burden for the developer (*regulatory sandboxes*); (ii) sandboxes mainly designed to test certain strategies or objectives of the regulator or supervisor, sometimes by offering more relaxed supervision and regulations

[89] Monetary Authority of Singapore & University of Cambridge´s Centre for Alternative Finance, *supra* note 78.
[90] Monetary Authority of Singapore & University of Cambridge´s Centre for Alternative Finance, *supra* note 78.
[91] For an analysis of the concept and features of the sandbox as a regulatory strategy, see Douglas W. Arner, Janos Nathan Barberi & Ross P. Buckley, "FinTech and RegTech in a Nutshell, and the Future in a Sandbox" (2017), 3:4 CFA Institute Research Foundation 1.
[92] See Schan Duff, "Regulatory Sandboxes: Modernizing Digital Financial Regulation" (2017) Aspen Institute, available at https://www.aspeninstitute.org/publications/modernizing-digital-financial-regulation-evolving-role-reglabs-regulatory-stack/; Ivo Jenik & Kate Lauer, "Regulatory Sandboxes and Financial Inclusion" (2017) CGCAP, available at https://www.cgap.org/sites/default/files/Working-Paper-Regulatory-Sandboxes-Oct-2017.pdf; Diego Herrera & Sonia Vadillo, "Sandbox regulatorio en América Latina y el Caribe para el ecosistema FinTech y el sistema financiero" (2018) Banco Interamericano de Desarrollo – Documento Para Discusión No 573 available at http://progresomicrofinanzas.org/wp-content/uploads/2018/06/Publicaciones-MF-Sandbox-Regulatorio-en-America-Latina-y-el-Caribe-para-el-ecosistema-FinTech-y-el-sistema-financiero-vf.pdf.
[93] See Early Lessons on Regulatory Innovations to Enable Inclusive FinTech, *supra* note 53.*f*

to innovators (*supervision sandbox*); (iii) sandboxes involving various jurisdictions (*multi-jurisdictional sandbox*); and (iv) sandboxes mainly designed to promote specific regulatory goals (e.g., financial inclusion), even if they take the form of some of the previous sandboxes.

The regulatory sandbox is the most common type of sandbox. This regulatory approach to promote financial innovation, pioneered by the UK FCA and then replicated in many jurisdictions around the world, allows innovators to test their products in a safe environment while enjoying the benefits associated with being subject to a lower regulatory burden. During the testing period, the innovator is subject to more friendly environment, compensated by the fact that the innovator will be subject to a close supervision of the regulator. Once the product has been tested, or the period to be subject to the sandbox has expired, the innovator will be subject to the entire regulatory framework associated with the product.

Supervisory sandboxes have the primary objective of assessing regulation that has become an obstacle for financial innovation. By working closely with innovators, the regulator expects to know whether the regulatory framework needs to be changed. This supervisory sandbox is used, for example, in jurisdictions such as Hong Kong and Colombia. Likewise, the sandbox implemented by the Monetary Authority of Singapore also meets some supervisory goals. Therefore, the sandbox implemented in Singapore has elements of both the regulatory and the supervisory sandbox.

In practice, the difference between a regulatory sandbox and a supervisory sandbox is not that clear. Normally, it relies on the primary objective that the regulator has attributed to the sandbox.[94] If, for example, the regulator establishes that the primary objective of the

[94] It is important to note that not all sandboxes require legislative action ore ven changes in the regulation applicable to financial markets for enactment. Some financial agencies have rule making power, and even the ability to provide discretionary relief in the normal course. This is the case of Singapore where the Monetary Authority of Singapore has the power (granted by the Monetary Authority Act) to relax certain regulatory requirements that a business would otherwise be subject to. MAS is the integrated regulator and supervisor of financial institutions in Singapore. MAS establishes rules for financial institutions which are implemented through legislation, regulations, directions and notices. Guidelines have also been formulated to encourage best practices among financial institutions. Combined with close supervision, these instruments help MAS achieve the outcome of a sound and progressive financial services sector. See Supervisory Approach and Regulatory Instruments, available at: https://www.mas.gov.sg/regulation/MAS-Supervisory-Approach-and-Regulatory-Instruments (Last visit 20 July 2020)

sandbox is to promote product innovation by relaxing the regulatory burder for companies, the sandbox can be classified as a regulatory sandbox. By contrast, if according to the regulator, the main objective of implementing a sandbox is the analysis and evaluation of the regulation and its potential impact on financial innovation, this type of sandbox can probably be classified as a supervisory sandbox. In addition, a second difference between both types of sandboxes is the degree of compliance with the regulatory framework required by the innovator. In theory, the regulatory sandbox temporarily exempts an innovator from some regulatory burdens, while the supervisory sandbox does not. However, jurisdictions formally adopting a supervisory sandbox, such as Colombia or Hong Kong, also exempt the developer from various regulatory burdens. Therefore, the practical difference between both types of sandboxes are not very significant. Finally, it should be borne in kept in mind that even if a sandbox is formally implemented as a mechanism to test products and thereby contribute to innovation, it can also contribute to the understanding and improvement of the regulatory framework in the future. Therefore, a regulatory sandbox can end up fulfilling the objectives of those initially conceived as supervisory sandboxes.

The third type of sandbox observed internationally is the so-called multi-jurisdictional sandbox. In a globalized world where financial services are provided borderless, this multi-jurisdictional approach may be very attractive to innovators. However, it represents significant coordination challenges for regulators. For this reason, various initiatives have emerged in the past years, including the Application Programming Interface Exchange ("**API Exchange**" or "**APIX**"), and the Global Financial Innovation Network ("**GFIN**"). APIX is a platform where several regulators from Asia participate and banks and fintech companies from different jurisdictions connect with each other in order to develop new products and services under a test scheme. This initiative was launched during the 2018 Singapore Fintech Festival.[95] GFIN was formally launched in January 2019 by an

In contrast, in Spain, the regulatory sandbox requires a legislative change. The Spanish Council of Ministers approved the draft bill on the "digital transformation of the financial system on 22 February 2020.The Draft Bill was introduced in the Parliament for debate. See "El Gobierno aprueba el 'sandbox' regulatorio y supervisor para fintech" (2020) El Confidencial, available at: https://www.elconfidencial.com/economia/2020-02-18/gobierno-sandbox-regulatorio-supervisor-fintech_2460244/

[95] See Fintechnews Singapore, "APIX, a Global Marketplace for Cross-Border Fintech Services Officially Hits The Market" (2018) available at: http://fintechnews.sg/26086/ai/mas-modi-launch-fintech-marketplace-apix-sandbox/.

international group of financial regulators and related organisations.[96] Regulators from the United Kingdom, Canada, Australia, Bahrain, Guernsey, Hong Kong, Kazakhstan, Singapore, United Arab Emirates and United States are the coodinators of this initiative.[97]

Finally, other types of sandboxes that can be found internationally are those focused on regulatory objectives. For instance, some jurisdictions have implemented this type of sandboxes to promote objectives such as financial inclusion,[98] the use of new technologies for customer awareness,[99] improvements in payment systems,[100] or improved access to credit for small and medium businesses.[101]

Despite the great popularity of sandboxes worldwide, there is no empirical evidence of their real contribution to financial innovation.[102] Moreover, due to the variety of sandboxes existing internationally, as well as the numerous factors affecting financial innovation, it will probably be difficult to see any empirical study showing this causation.

There are also many operational differences among sandboxes. For example, developing a sandbox in a developing economy takes up to 18 months.[103] In developed markets, starting a sandbox generally requires a minimum of at least six months.[104] Additionally, the number and level of expertise of employees involved in the development of the sandbox also varies across jurisdictions. There are regulators who assign only one full-time officer to the sandbox, while others have formed teams of more than 10 full-time employees.[105] Likewise, the scope of sandbox may also differ. Sandboxes may have

[96] See "Global Financial Innovation Network (GFIN)" (2019), available at: https://www.osc.gov.on.ca/documents/en/News/nr_20190131_gfin-webpage-content.pdf (Last visit: 22 July 2020)
[97] *Ibid.*
[98] Examples of this type of sandboxes could be those of Malaysia, Bahrain, and Sierra Leone.
[99] This objective seems to have guided the implementation of the sandbox in Japan.
[100] This objective is pursued, for example, in the sandbox implemented in Thailand.
[101] An example of this type can be found in the sandbox of Abu Dhabi.
[102] See Ross P. Buckley, Douglas W. Arner, Robin Veidt & Dirk A. Zetzsche, Building Fintech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond, University of New South Wales Law Research Paper No. 19-72 (2019), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3455872
[103] See FinTech Working Group of the United Nations Secretary-General's Special Advocate for Inclusive Finance for Development (UNSGSA) and Cambridge Centre for Alternative Finance (CCAF) at the University of Cambridge Judge Business School, *Early Lessons on Regulatory Innovations to Enable Inclusive FinTech: Innovation Offices, Regulatory Sandboxes, and RegTech* (2019), available at: https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-early-lessons-regulatory-innovations-enable-inclusive-fintech.pdf
[104] *Ibid.*
[105] *Ibid.*

limited jurisdictional reach. For example, the CSA sandbox only covers matters with the supervisory perimeter of *securities* regulators. It does not cover other financial matters like payments, money services and banking services. In contrast, the FCA sandbox, has a wider perimeter.[106] Thus, a high number of applications to the sandbox is not necessarily a positive indicator of the level of financial innovation in the country. In fact, it can be the opposite: due to the unattractiveness of the regulatory framework, innovators may need to apply to the sandbox as a way to reduce the regulatory burden associated with their products.

Implementing a sandbox is a more expensive strategy than opening an innovation office or using ”no action letters”. From the perspective of the regulator, the sandbox implies a long-term support effort that will require higher costs associated with training and hiring employees. In addition, the implementation of a sandbox requires a high degree of sophistication and independence of the supervisor.[107] Therefore, in countries without independent and sophisticated regulators, or even in countries with reliable regulators but lacking the resources needed to successfully implement a sandbox, the regulatory sandbox might not be a desirable solution. Instead, they should assess the desirability of other regulatory strategies such as, for example, innovation offices and, if so, a “doing nothing” followed by the enactment of new regulation once the industry has grown enough.

From a policy perspective, the adoption of a sandbox makes sense only when, after a careful assessment, it is determined that the country and the industry have the knowledge, the resources, the credibility and the needs to engage in this interactive approach in a reliable manner not only for innovators and regulatrs but also for financial consumers and other stakeholders. Some argue that having a sandbox sends a message to the market that a regulator is flexible and open to innovation in a way that other regulatory strategies do

[106] See Ross P. Buckley, Douglas W. Arner, Robin Veidt, Dirk A. Zetzsche, *Building FinTech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond*, 61 WASHINGTON UNIVERSITY JOURNAL OF LAW AND POLICY (2020), availabe at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3455872

[107] Granting more operational autonomy to the agencies that keep an eye on the financial sector can bolster financial stability. An independent regulator can ensure that the rules of the regulatory game are applied consistently and objectively over time. In contrast, when external parties, such as politicians or even supervised or regulated institutions, become directly involved in enforcing regulations, they may be influenced by other considerations in making their decisions, which then take on an ad hoc quality. See Udaibir S. Das, Marc Quintyn, & Michael W. Taylor, Financial Regulators Need Independence, 39 Finance and Development 4 (2002), available at: https://www.imf.org/external/pubs/ft/fandd/2002/12/das.htm

not.[108] The evidence suggests that approximately a quarter of regulators have launched these types of initiatives without first evaluating the need, suitability, demand, potential results, or side effects of this regulatory strategy.[109] Some initiatives may be motivated by the desire to replicate, albeit in countries with a totally different economic, institutional and legal environment, the regulatory strategies followed in leading fintech hubs. In other cases, the adoption of a sandbox may be a way to try to be competitive as an indicator of regulatory innovation regardless of the real impact of this strategy on the country's level of innovation in the financial sector.[110]

In summary, the desirability, costs, objective and risks of a sandbox in a particular country should be carefully examined before adopting this regulatory strategy. In countries where regulators do not have the level of sophistication or resources needed to implement this approach, a sandbox can end up doing more harm than good. Indeed, in these countries, the lack of sophistication may harmper the enriching and valuable experience associated with the sandbox and it can actually harm consumer protection if, for example, regulators do not have the knowledge or resources to undertand the product developed by the innovator, or to closely monitor the entrepreneur during the testing period. Therefore, since the benefits and risks of a sandbox may differ across jurisdictions, the adoption of this regulatory strategy would only make sense if, after a carefuly examination of the particular features of the country, it is determined that a sandbox is needed, and it can be more desirable than other regulatory strategies.

2.5. New Regulatory Frameworks

Finally, another regulatory strategy to promote financial innovation may consist of the enactment of new legislation for fintech companies. Several countries adopted this

[108] See Ross P. Buckley, Douglas W. Arner, Robin Veidt, Dirk A. Zetzsche, *Building FinTech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond*, 61 WASHINGTON UNIVERSITY JOURNAL OF LAW AND POLICY (2020), availabe at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3455872

[109] See FinTech Working Group of the United Nations Secretary-General's Special Advocate for Inclusive Finance for Development (UNSGSA) and Cambridge Centre for Alternative Finance (CCAF) at the University of Cambridge Judge Business School, *Early Lessons on Regulatory Innovations to Enable Inclusive FinTech: Innovation Offices, Regulatory Sandboxes, and RegTech* (2019), available at: https://www.jbs.cam.ac.uk/fileadmin/user_upload/research/centres/alternative-finance/downloads/2019-early-lessons-regulatory-innovations-enable-inclusive-fintech.pdf

[110] *Ibid*.

strategy, such as Hong Kong (with the new licensing regime for neobanks),[111] Germany[112] and Malta[113] (with the enactment of new legislation for blockchain and virtual assets), the United States (with the fintech charter proposed by the Office of the Comptroller of the Currency),[114] and Mexico (with the enactment of a Fintech Act in 2018).[115]

The enactment of new regulatory frameworks has the advantage of giving a clear and homogeneous strategy to all market participants. Moreover, the new regulatory framework, if properly designed, may provide a more adequate response to the needs and risks of the current financial services industry. However, this regulatory strategy is not perfect either. On the one hand, regulators cannot be sure that the new regulation will achieve the proposed objectives, especially in the context of new business models that are either hard to define or do not seem to fit well within the existent regulatory framework.[116]

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[111] See Hong Kong Monetary Authority, *Virtual Banks*, available at: https://www.hkma.gov.hk/eng/key-functions/banking/banking-regulatory-and-supervisory-regime/virtual-banks/

[112] Germany's government has passed a new strategy outlining the ways the leading EU state is planning to use blockchains. A draft law on digital securities is scheduled to be introduced by the end of this year, according to this strategy. See Anna Baydakova, *Germany Passes National Policy to Explore Blockchain But Limit Stablecoins*, COINDESK (2020), available at: https://www.coindesk.com/germany-passes-national-policy-to-explore-blockchain-but-limit-stablecoins; Federal Ministry of Economic Affairs and Energy, *Blockchain Strategy of the Federal Government* (2020), available at: https://www.blockchain-strategie.de/BC/Navigation/DE/Home/home.html

[113] See Malta Virtual Financial Assets Act (2018), avilable at: http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=12872&l=1

[114] The fintech charter looked to expedite the licensing process by allowing companies to offer lending or payments products without having to accept deposit insurance, or comply with banking regulations state-by-state. See Office of the Comprtroller of the Currency, Exploring Special Purpose National Bank Charters for Fintech Companies (2020), available at: https://www.occ.gov/publications-and-resources/publications/banker-education/files/exploring-special-purpose-nat-bank-charters-fintech-companies.html

This initiative was higly controversial. The OCC's plan oponents were the state and local government regulators in both New York and Washington, D.C., each of which raised similar legal challenges to the Fintech Charter plan. New York's Department of Financial Services ("NYDFS") argued that the OCC's regulatory authority does not include the power to grant a charter to a nondepository institution, such as a Fintech company. NYDFS won the case, but the OCC appealed the decision. Additionally, On November 7, 2019, 61 consumer, community, and civil rights advocacy groups wrote letters to the Federal Reserve, OCC, and FDIC pledging to "vigorously fight efforts by predatory lenders to shield themselves with a bank charter." In 2015, Madden decision (Madden v. Midland Funding LLC, 786 F.3d 246 (2d Cir. 2015)) limited the ability of nonbank debt purchasers to benefit from the National Bank Act's preemption of state usury law. The Madden court held that the purchaser of a credit card portfolio, because it was not a national bank could not charge the same interest rates that had been permissible for the national bank. See Jones Day, "OCC Fintech Charter Headed to the Second Circuit" (2020), available at: https://www.jonesday.com/en/insights/2020/01/occ-fintech-charter-headed-to-the-second-circuit

[115] See Ley para regular las instituciones de tecnología financiera (2018), available at: http://www.diputados.gob.mx/LeyesBiblio/pdf/LRITF_090318.pdf

[116] For example, the variaty and innovation, not only in terms of the technology, but also with regards to the infrasttructure behind its operation, the cryptoassets have challenged regulators around the world in the past couple of years making them analyze how the current regulatory frameworks apply to them and whether a new regulatory framework is necessary to address the challenges of it. See See Aurelio Gurrea-Martínez & Nydia Remolina, *The Law and Finance of Initial Coin Offerings*, in Chris Brummer (ed.), *Cryptoassets: Legal, Regulatory and Monetary Perspectives* (Oxford University Press, 2019) at 130-135.

In some cases, regulators do not have the knowledge and expertise to design this 'optimal' legislation. In other cases, regulators may have been influenced by some regulatory approaches that, while successful in other jurisdictions, might not work in a particular country, due to their legal, economic and institutional divergences, or the different needs and goals of a financial regulator. Finally, markets and technological innovation will probably go ahead of any regulatory framework. Therefore, a new legislation can quickly become obsolete in the current changing environment driven by technological innovation.

In any case, if this strategy is chosen, we believe that the new legislation should be based on principles and activities, and not on products and entities authorized by licenses.[117] Likewise, fintech regulation should be technology neutral and device agnostic.[118] Unfortunately, not all regulators have opted for this type of regulation. Currently there is a proliferation of new licenses that might create regulatory arbitrage, lack of a level playing field, and do not properly address the risks generated by companies performing similar functions than those performed by the traditional financial services industry.[119] In our opinion, functionally similar activities should be subject to similar regulations, since they generate similar risks. If this activity and risk-based approach is not adopted, we may end up observing something similar to what happened in the 2008 financial crisis: a lack of regulation and supervision of companies that, despite of creating similar risks, have different nature and regulatory frameworks.[120]

3. IS A DIFFERENT REGULATORY TREATMENT JUSTIFIED FOR THE

[117] In the same way, see Basel Committee on Banking Supervision, "Sound Practices. Implications of fintech developments for banks and bank supervisors" (2018) Bank for International Settlements Publication.

[118] See Competition Bureau of Canada, "Technology-Led Innovation In The Canadian Financial Services Sector — A Market Study" (2017), available at: http://www.competitionbureau.gc.ca/eic/site/cb-bc.nsf/vwapj/FinTech-MarketStudy-December2017-Eng.pdf/$FILE/FinTech-MarketStudy-December2017-Eng.pdf

[119] For instnce, the New York Bitlicense has been critisized because of similar reasons. The BitLicense is a business license issued for cryptocurrency operations in New York State. Intended for companies who operate in New York State and serve New York residents, the license and its regulatory framework is administered by the New York State Financial Services Department or NYSDFS. For some, enforcing a stringent framework on the digital currency industry, requiring it to record the personal details of users, monitor their activity and retain that information for several years, feels like a retrograde step. Also, it favours large players and has driven almost all virtual currency and many distributed-ledger technology start-ups out of New York State. See Paul Golden, "BitLicense not template for UK, say experts", Euromoney (2016), available at: https://www.euromoney.com/article/b12kq5r43sj0wb/bitlicense-not-template-for-uk-say-experts?copyrightInfo=true

[120] See Saule T. Omarova, *New Tech v. New Deal: Fintech As A Systemic Phenomenon*, 36 YALE JOURNAL ON REGULATION 735, available at: https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=1545&context=yjreg

FINTECH INDUSTRY?

Before addressing this question, it is worth mentioning that innovation itself is not generally considered a goal of financial regulation.[121] However, it is truth that the use of technology can *enhance* the functions expected from the financial system.[122] For example, technological developments can help promote competition in the financial services industry and it can reduce transactions costs.[123] Therefore, it can promote financial inclusion and firms' access to finance.

Despite these benefits, the use of technologies in the financial sector can also create various problems. For example, the use of algorithms for credit scoring can cause discrimination and financial exclusion.[124] Also, the increasing use of the internet has exposed individuals and firms to more cyber attacks. Therefore, if these risks are not properly addressed, the use of technology may end up harming the most fundamental pillar of a financial system: trust.

This balance between the benefits and risks of technology and financial innovation is not new.[125] However, the use of new technologies in the financial services industry is exacerbating some of the existing risks, and it is also creating new challenges for regulators. Therefore, this "fintech era" brings differentiating elements. First, much of

[121] Although the mandates of financial regulators differ between countries, or between the type of financial regulator / supervisor (eg, banking supervisor, stock market supervisor, sole supervisor, etc.), they are normally associated with promoting stability, development and competition. of the financial system, the protection of consumers and investors and the integrity of the financial market. On the objectives of financial regulation, see John Armour et. al., *Principles of Financial Regulation* (Oxford University Press, 2016)at 61-72.

[122] About the functions of the financial system, and how these functions can contribute to promoting economic growth and improving collective welfare, see *ibid.* at 22-50. About the relationship between the financial system and economic growth, see Ross Levine, "Financial Development and Economic Growth: Views and Agenda" (1997) 35 Journal of Financial Intermediation 688.

[123] See World Bank, "Fintech and Financial Inclusion", available at http://pubdocs.worldbank.org/en/877721478111918039/breakout-DigiFinance-McConaghy-Fintech.pdf.

[124] On the discrimination in the granting of a loan made by the algorithms and, therefore, the possible impact of this technology on the cost and access to credit and, with it, the levels of financial inclusion of a country, see Robert Bartlett, Adair Morse, Richard Stanton, & Nancy Wallace, Consumer-Lending Discrimination in the FinTech Era (2019), available at https://faculty.haas.berkeley.edu/morse/research/papers/discrim.pdf.

[125] See World Economic Forum, "Beyond fintech: a pragmatic assessment of disruptive potential in financial services" (2017); Dong He et al., "Fintech and Financial Services: Initial Considerations" (2017) International Monetary Fund.

today's technologies use a massive amount of data.[126] While the information used by a financial institution in the past was obtained directly from a series of questions to their customers, the use of social networks and alternative data are currently serving as valuable tools of information to understand patterns and behaviors of financial consumers.[127] Second, there is an increasing automation of financial services that might increase the risks associated with certain financial services and activities.[128] Therefore, new challenges may emerged when financial services are not directly provided from the interaction between companies and consumers. Third, in addition to the traditional actors existing in the financial services industry, new players have emerged, including tech companies and fintech firms. Therefore, new actors may imply new challenges, not only from the perspective of the risks and challenges that financial regulation needs to address, but also in terms of the costs of the regulatory framework.[129] Besides, the interaction between old and new actors can cause a fragmentation in the financial services supply chain that has not been previously seen or evaluated by regulators.[130] Therefore, despite the advantages generated by new actors (especially in terms of competition, innovation and financial inclusion), regulators need to be aware of the rise of new risks.

For some authors, promoting financial innovation will imply that other regulatory objectives might be undermined.[131] Specifically, it has been argued that, when simultaneously seeking to provide clear rules, maintain market integrity, and foster financial innovation, regulators can achieve, at best, two of these three goals.[132] Additionally, the consequences of the use of financial technologies vary considerably depending on the impact on the value chain and the technology employed for a particular

[126] 90% of the information that humanity has generated in its entire history has been produced in the last two years. See Héctor Vázquez, "Big Data, la Revolución de los Datos Masivos" (2019), available at https://www.michaelpage.es/advice/empresas/desarrollo-profesional/big-data-la-revoluci%C3%B3n-de-los-datos-masivos.
[127] See *supra* note 3.
[128] Automation in financial services has the potential amplify the effect of these destabilizing mechanisms, and thus exacerbate the tensions and imbalances in today's financial markets and the broader economy. See Saule T. Omarova, *New Tech v. New Deal: Fintech As A Systemic Phenomenon*, 36 YALE JOURNAL ON REGULATION 735, available at: https://digitalcommons.law.yale.edu/cgi/viewcontent.cgi?article=1545&context=yjreg
[129] For an analysis of the costs of financial regulation, see Luigi Zingales, "The Costs and Benefits of Financial Market Regulation" (2004) European Corporate Governance Institute – Law Working Paper No. 21/2004.
[130] See Christopher Brummer & Yesha Yadav, "Fintech and the Innovation Trilemma" (2019) Geo.L.J., available at https://georgetownlawjournal.org/articles/298/fintech-and-the-innovation-trilemma/pdf.
[131] *Ibid*.
[132] *Ibid*.

use case. In our view, a proper regulatory framework, especially in today's changing financial markets, should be based on three primary pillars: (i) risk-based supervision; (ii) principle-based regulation; and (iii) an activity-based regulation.

Firstly, risk-based regulation has gradually become the predominant approach to the regulation and supervision of financial markets around the world.[133] Under this model, there is a comprehensive risk assessment within the financial system.[134] Risk-based supervision has a normative emphasis on focusing on what should really matter to the regulator: assessing the level of risk generated by certain actors and activities and implementing regulatory strategies to address those risks in a comprehensive manner. Therefore, this approach not only seeks to address individual risks but also the risks for the entire financial system. In addition, under this approach, there is a permanent monitoring activity by the regulator, since the risks might be evolving or changing over time. In our view, this approach seems more suitable for the current fintech issues, characterized by rapid changes and technological developments. Materiality and proportionality that characterized the risk-based approach, are critical factors to adequately regulate financial technologies. When the risk posed by new technology becomes material, then regulation should be proposed, and the regulation must be proportionate to the risk posed.[135] Regulating prematurely may stifle innovation and potentially derail the adoption of useful technology.[136]

Secondly, principle-based regulation aims at meeting regulatory outcomes. The idea behind this objective is that entities should pursue goals (e.g., protecting the interest of the consumers), rather the following procedures, and the explain to the regulator how they achieve these goals. Therefore, this approach differs from the rule-based approach that was adopted in the past, or is adopted in other areas.[137] Advocates of the rules-based

[133] See Basel Committee on Banking Supervision, "Range of practice in the regulation and supervision of institutions relevant to financial inclusion" (2015), available at: https://www.bis.org/bcbs/publ/d310.pdf; https://www.cfainstitute.org/research/foundation/2017/fintech-and-regtech-in-a-nutshell-and-the-future-in-a-sandbox; https://www.bis.org/publ/arpdf/ar2019e3.htm; https://www.bis.org/fsi/publ/insights23.pdf

[134] For a detailed analysis of the concept and scope of risk-based supervision, see Armour, *supra* note 76 at 581-582

[135] See Sai Fan Pei, *Singapore approach to develop and regulate FinTech*, RESEARCH COLLECTION LEE KONG CHIAN SCHOOL OF BUSINESS (2018), available at: https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?article=6910&context=lkcsb_research

[136] *Ibid*.

[137] See Pascal Frantz & Norvald Instefjord, "Rules vs Principles Based Financial Regulation" (2014), available at: https://ssrn.com/abstract=2561370; Mathias Dewatripont & Jean Tirole, *The Prudential*

approach argue that principles-based approach does not provide legal certainty for market particpants and it is reduced to de-regulation or lax regulation.[138] Nonetheless, in practice, it is rare for to have either a purely principles-based or a purely rules-based regulation. Rather, they represent two ends of the regulatory spectrum in most cases. Every principles-based regulatory regime has some rules, and every rules-based regime has some element of principle. The appropriate mix of each will depend on a number of factors, such as the regulatory objective, maturity of the market, the characteristics of market participants, and quality of the regulator.[139] However, in our opinion, a principle-based regulation is more appropriate for most fintech matters due to the inability of the regulator to catch up with the market[140], and to give enough room for innovation.

Thirdly, we also think that activity-based regulation is more appropriate than an institution-based approach, especially in this new era of financial technologies. Strictly understood, an institution-based approach involve the imposition of different rules for different entities even if they perform similar functions or they create similar risks. Thus, leaving aside other considerations (e.g., fairness, antitrust issues, level playing field), this approach not only can create regulatory arbitrage and shadow banking but it can also be insufficient to address individual and systemic risks generated in the financial system.[141] However, we must note that some argue that entity and activities-based approaches are complementary tools that are each essential for effectively regulating nonbank systemic risk.[142] The activity-based approach to regulation in a fintech context might be challenging given that a firm often provides a product or service and in the process

Regulation of Banks (MIT Press, 1993); Financial Services Authority, "Principles Based Regulation: Focusing on the Outcomes that Matter" (2007); Julian R. Franks, Stephen M. Shaefer & Michael D. Staunton, "" (1998) 21 Journal of Banking and Finance 1547..

[138] Julia Black, *Forms and Paradoxes of Principles Based Regulation*, LSE LAW, SOCIETY AND ECONOMY WORKING PAPERS 13 (2008), available at: http://www.lse.ac.uk/law/working-paper-series/2007-08/WPS2008-13-Black.pdf

[139] Commodity Futures Trading Commission, Fintech Regulation Needs More Principles, Not More Rules (2019), available at: https://www.cftc.gov/PressRoom/PressReleases/8081-19

[140] See Douglas W. Arner, Janos Nathan Barberis & Ross. P. Buckley, "The Evolution of Fintech: A New Post-Crisis Paradigm?" (2015) University of Hong Kong Faculty Law Research Paper No. 2015/047.

[141] See Marc Lebonte & Baird Webel, "Activities-Based Regulation and Systemic Risk" (2019) CRS Insight, available at https://fas.org/sgp/crs/misc/IN10997.pdf.

[142] Eliminating an entity-based approach to nonbank systemic risk could expose the financial system to the same risks that it experienced in 2008 as a result of distress at nonbanks like AIG, Bear Stearns, and Lehman Brothers. This conclusion is especially salient in jurisdictions such as the United States, where regulatory fragmentation undermines the capacity of financial regulators to implement an effective activities-based approach and to asses the risks adequately. See Jeremy C. Kress, Patricia A. McCoy & Daniel Schwarcz, Regulating Entities and Activities: Complementary Approaches to Nonbank Systemic Risk, 92 SOUTHERN CALIFORNIA LAW REVIEW 1455 (2019), available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3238059

triggers the oversight of multiple regulatory agencies. Under these circumstances, an activity-based approach is challenging and requires important coordination efforts from regulatory authorities. For example, some authors have argued that an activity-based approach is more appropriate in the context of capital markets.[143] Also, a concern that some have with activity-based regulation is that regulators in some jurisdictions, particularly those that are not primarily prudential regulators, may not have the competence or ability to identify and address this type of regulation in all cases.[144]

Even though, as a general rule, we believe that an approach that is both activity-based and risk-based is much more appropriate, especially in these changing times, the most appropriate regulatory strategy should be determined based on the particular features of a jurisdiction. Thus, the desirability of each approach may differ across countries and industries.

4. FINTECH HUBS

A strong competition is not only perceived in the financial services industry but also among countries seeking to position themselves as fintech hubs.[145] Building a fintech hub can be beneficial for a country for a variety of reasons [146] First, by promoting financial innovation, countries can enhance the attractiveness and competition of their financial sectors. Therefore, it may lead to more financial inclusion and better financial services. Second, increasing a country's profile as a fintech hub, and leading the international debate on fintech can also be a profitable business for a country. For example, Singapore, which is considered one of the main fintech hubs in the world,[147] received more than

[143] See Charles W. Calomiris & Doron Nissim, "Activity-based valuation of bank holding companies" (2007) National Bureau of Economic Research; Ross Levine & James R. Barth, "Bank regulation and supervision: what works best?" (2002) NBER Working Paper No. 9323. See also Ross Levine, James R. Barth & Gerard Caprio, *Rethinking Bank Regulation: Till Angels Govern* (Cambridge University Press, 2008).

[144] Charles W. Calomiris, "Financial innovation, regulation, and reform" (2009) 29 Cato Journal 65.

[145] This regulatory competence is not only seen in countries such as the United States, the United Kingdom, Switzerland, and Singapore, but also in regions with emerging countries, as could be the case in Latin America. See See Nydia Remolina, "Contextualizing Regulatory Sandboxes in Latin America" (2019) Fintech Policy, available at https://fintechpolicy.org/2019/01/20/contextualizing-regulatory-sandboxes-in-latin-america/.

[146] Analyzing different regulatory strategies to become a fintech hub, see Buckley, Arner, Veidt & Zetzsche, *supra* note 14.

[147] See Bank of International Settlements, New BIS Innovation Hub Centre in Singapore (2019), available at: https://www.bis.org/press/p191113.htm; Stefania Palma, Singapore expands fintech to stay ahead of

60,000 people from more than 140 countries for the 2019 Fintech Festival.[148] Therefore, since this event can generate revenues for several industries (e.g., hotels, hotels, airlines, restaurants, event agencies, etc.), becoming a leading voice in the fintech space can be beneficial not only for the financial services industry but also for other sectors in the real economy.

Being a fintech hub not only depends on the financial regulator and the industry. There are a variety of legal and institutional aspects that can affect a country's ability to become a fintech hub. These factors may include the non-financial regulatory framework (e.g., privacy law, data protection laws, antitrust law, private international law), proper coordination among national regulators (e.g., financial regulators, data protection regulators, antitrust authorities), as well as the level of sophistication of the academic and policy debate.[149]

Determining which factors make a jurisdiction a 'fintech hub' is not an easy task. While it is true that some countries, such as Singapore, Switzerland, the United States and the United Kingdom, are more popular than others in the fintech space, there are no 'good policies' to become a fintech hub. The best regulatory approach to become a fintech hub, and more generally to promote financial innovation, will depend on the particular features of the country. Therefore, even though some factors, including the sophistication of the regulator and the policy debate, the allocation of resources to human capital and research activities, and a thoughtful assessement of the regulatory framework in place, can facilitate this goal, there are no 'one-size-fits-all recipes' to become a fintech hub.

It is also too early to conclude whether this international regulatory competition in the fintech space will lead to a "race to the top" or a "race to the bottom".[150] Given the early

other financial centres, FINANCIAL TIMES (2019), https://www.ft.com/content/e7000952-b8fa-11e9-8a88-aa6628ac896c

[148] See https://www.mas.gov.sg/news/media-releases/2019/sff-x-switch.

[149] Arguing that academics can play a significant role in the promotion of these debates, ultimately leading to better regulatory frameworks, see Aurelio Gurrea-Martínez, "The Colombian Simplified Stock Corporation as a Paradigm of Legal Innovation: Thoughts about the Role of Legal Scholars in Society", in Francisco Reyes Villamizar (ed.), *The Simplified Stock Corporation: Influence in Latin America* (Legis, 2018) at 107-133.

[150] For an analysis of these concepts in different areas of business law, see John Armour, "Who Should Make Corporate Law? EC Legislation versus Regulatory Competition", 58 Current Legal Problems 369 (2005); Horst Eidenmüller, "Free Choice in International Company Insolvency Law in Europe", 6 European Business Organization Law 423 (2005); Luca Enriques and Martin Gelter, "Regulatory Competition in

stage of the debate, we will probably need more time to accurately assess the success of different countries and regulatory strategies to become a fintech hub.

5. THE USE OF EMERGING TECHNOLOGIES FOR FINANCIAL SUPERVISION

The rise of technologies is not only affecting actors and products in the financial services industry but also the way financial markets are supervised. The use of technologies for financial supervision, usually known as "suptech,"[151] is being used by more and more supervisors.[152] Namely, financial supervisors seem to be relying more on artificial intelligence, machine learning, and blockchain for the implementation of their supervisory strategies.[153] In addition, the use of Big Data promises to expand the capacity of supervisors by extracting useful information from large volumes of unstructured data.[154] This functionality could be used to support risk assessments of financial institutions, monitoring or examination exercises or improvements in regulatory guidance. Moreover, markets and reporting systems based on blockchain or distributed registries could allow supervisors to monitor the exposures and transactions of market participants in real time as network nodes, which, combined with artificial intelligence capabilities, could also improve supervisory functions.[155]

Table 1. Use of new technology for financial supervision

Technology	**Supervisory Agency[156]**										
API[157]	ASIC		BSP							BC	

European Company Law and Creditor Protection", 7 European Business Organization Law Review 417 (2006); Roberta Romano, "The Need for Competition in International Securities Regulation", Yale ICF Working Paper No. 00-49 (2001).

[151] The term "suptech" comes from supervision (sup) and technology (tech). However, this is also Also commonly referred to as "regtech". See Douglas W. Arner, Janos Barberis & Ross. P. Buckley, Fintech, Regtech and the Reconceptualization of Financial Regulation, 37 Northwestern Journal of International Law & Business 371 (2017), available at https://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=1817&context=njilb

[152] According to the Financial Stability Institute, only 10 supervisory and regulatory agencies are using suptech. See https://www.bis.org/fsi/publ/insights9.pdf.

[153] For the purpose of this chapter, we understand the concept of blockchain in a broad sense, that is, as distributed ledger technologies (DLT).

[154] See https://www.bis.org/bcbs/publ/d431_es.pdf.

[155] See https://www.bis.org/fsi/publ/insights9.pdf.

[156] (i) ASIC: Australia; (ii) BSP: Filipinas; (iii) CNBV: Mexico; (iv) DNB: Netherland; (v) FCA: United Kingdom; (vi) MAS: Singapore; (vi) OeNB: Austria; (vii) SEC: United States; (viii) BC: Bank of Canada; (ix) CSA: Canadian Securities Administrators; (x) OSFI: he Office of the Superintendent of Financial Institutions.

[157] API is the abbreviation of Application Programming Interface. For a detailed analysis of this concept,

Cloud computing	ASIC			CNBV	DNB	FCA			SEC	BC	
Chatbots			BSP			FCA					
Big Data	ASIC			CNBV	DNB	FCA	MAS		SEC	BC	CSA
Inteligencia Artificial				CNBV	DNB	FCA	MAS		SEC	BC	CSA
Neural Networks					DNB			OeNB	SEC	BC	
Machine learning	ASIC			CNBV	DNB	FCA	MAS	OeNB	SEC	BC	CSA

Source: Financial Stability Institute (2018) and authors.

Although the use of new technologies for financial supervisors has not been broadly extended yet, and the debate on suptech is still less popular than those generated by the rise of fintech, we believe that, in the coming years, more regulators will keep exploring the opportunities associated with the use of new technologies for the supervision of financial markets, as well as the costs, risks and implementation steps associated with it. However, the increasing use of suptech may expose supervisory agencies to new risks, such as legal risk, operational risk, cyber-risks, and reputational risks. Therefore, addressing these challenges should be a priority to maximize the potential of emerging technologies for financial supervision.[158]

6. CONCLUSION

This Article has explored the most common regulatory strategies used by financial regulators around the world to address the challenges generated by the rise of fintech. These strategies include the imposition of bans, regulatory passivity, adoption of new legislation, permission on a case by case basis, and more interactive approaches such as innovation offices, accelerators and sandboxes. After conducting a comparative and functional analysis of these approaches, it has been argued that the adoption and desirability of each regulatory response will depend on a variety of country-specific factors, including the goals and priorities of the regulator and the particular features of a country. Thefore, there are no one-size-fits-all solutions that can be suggested to

and how it is affecting the financial industry, see Nydia Remolina, "Open Banking: Regulatory Challenges for a New Form of Financial Intermediation in a Data-Driven World" (2019) SMU Centre for AI & Data Governance Research Paper No. 2019/05, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3475019

[158] Dirk Broeders & Jermy Prenio, "Innovative technology in financial supervision (suptech) – the experience of early users", Financial Stability Institute. FSI Insights on policy implementation No. 9. (2018), available at: https://www.bis.org/fsi/publ/insights9.pdf

promote financial innovation and effectively address the challenges associated with the rise of new technologies in the financial services industry.