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# FINANCIAL INNOVATIONS IN MODERN FINANCIAL SYSTEM — ANALYTICAL BASICS AND PRACTICAL ASPECTS

## FINANSIJSKE INOVACIJE U MODERNOM FINANSIJSKOM SISTEMU - ANALITIČKE OSNOVE I PRAKTIČNI ASPEKTI

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JEL CLASSIFICATION: G01, G15, G20.

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### ABSTRACT:

*Last century was full of innovations: new technologies, new products, new services and a plethora of new industries emerged. Yet the call for innovation in business, especially in financial services, has never been more intense. For all its alleged importance as a driver of the financial crisis, we know remarkably little about financial innovation, its importance, and its systematic implications. Therefore, the primary goal of this paper is a theoretical and empirical review of financial innovations and their role and importance in the modern financial system. Innovation in the financial sector is promoted by factors such as technological dynamism and globalization, amongst others. The recent wave of financial innovation, particularly innovation related to the application of information and communication technologies, poses a serious challenge to the financial industry's business model in both its banking and non-banking components. The paper applies a compilation method to review existing theoretical and empirical research on the characteristics of financial innovation. The descriptive method, as a process of simply describing or reading facts, will be linked to explanations of the more important features of the facts described, their laws, and causal relationships. The main finding is that financial innovation is broadly beneficial and is needed to address many of society's challenges;*

*on the other hand, adverse outcomes associated with financial innovation are too serious to ignore. The importance of theoretical-empirical analysis is reflected in the fact that there are still no historical metrics in the world that would finally determine the impact of financial innovations at the global level, as well as an attempt to shed light on a wide range of challenges that must be addressed for society to continue to benefit from financial innovations in the sense of social and economic development. The analysis also highlights the need to build a more resilient financial system that is less prone to innovation with unintended negative consequences, as well as to encourage dialogue among stakeholders – financial sector, business, regulators, industry, consumers, and non-financial institutions.*

**KEYWORDS:****FINANCIAL INNOVATION, FINANCIAL SERVICES, FINTECH****ABSTRAKT:**

*Prošli vek bio je pun inovacija: pojavile su se nove tehnologije, novi proizvodi, nove usluge i mnoštvo novih industrija. S druge strane, pak, zahtev za inovacijama u poslu, posebno u finansijskim uslugama, nikada nije bio intenzivniji. Osim navodnih tvrdnji kao generatora ekonomske krize, u celini uzevši, znamo izuzetno malo o finansijskim inovacijama, njihovom značaju i sistemskim implikacijama. Stoga je primarni cilj ovog rada teorijski i empirijski osvrt na finansijske inovacije i njihovu ulogu i značaj u modernom finansijskom sistemu. Inovacije u finansijskom sektoru determinišu faktori kao što su tehnološki dinamizam i globalizacija, između ostalog. Nedavni talas finansijskih inovacija, posebno inovacija u vezi sa primenom informacionih i komunikacionih tehnologija, predstavlja ozbiljan izazov poslovnim modelu finansijske industrije po pitanju njegovih i bankarskih i nebankarskih komponenti. U radu je primenjena metoda kompilacije u svrhu pregleda postojećih teorijskih i empirijskih istraživanja o obeležjima finansijskih inovacija. Metoda deskripcije, kao postupak jednostavnog opisivanja ili očitavanja činjenica biće povezana s objašnjenjima o uočenim važnijim obeležjima opisivanih činjenica, njihovih zakonitosti i uzročnih veza i odnosa. Glavni nalaz jeste da su finansijske inovacije izuzetno korisne i da su nezaoblažne u rešavanju mnogih izazova u društvu; s druge strane, negativni ishodi povezani sa finansijskim inovacijama su previše ozbiljni da bi se ignorisali. Važnost teorijsko-empirijske analize ogleda se u činjenici što na svetu i dalje ne postoje istorijske metrike kojima bi se konačno utvrdio uticaj finansijskih inovacija na globalnom nivou, kao i pokušaju da se dodatno rasvetli široka lepeza izazova koji se moraju rešiti i na koje se mora odgovoriti kako bi društvo nastavilo da i dalje ima koristi od finansijskih inovacija u smislu društvenog i ekonomskog razvoja. Analiza ističe i važnost potrebe da se izgradi otporniji finansijski sistem koji je manje sklon inovacijama sa nenameravanim negativnim posledicama, kao i da se podstakne dijalog među zainteresovanim stranama - finansijski sektor, biznis, regulatorna tela, industrijski subjekti, potrošači i nefinansijske institucije.*

**KLJUČNE REČI:****FINANSIJSKE INOVACIJE, FINANSIJSKE USLUGE, FINTECH**

## 1. INTRODUCTION

Recently, the financial sector has been experiencing serious changes in the field of innovation in the domain of services, technology, platforms, and in a certain sense, the organizational structure. The essence of financial innovation, as an important phenomenon in the development scheme of financial markets, is reflected in their contribution to the strong strengthening of the functioning of the market mechanism in the financial sector of the economy.

Financial innovation can be considered as one of the forces of transformation not only in the financial sector but also in the more extensive economic infrastructure. Thanks to them, financial markets are being redefined and configured on a persistent basis.

The paper starts from the basic premise and author's opinion according to which financial innovations are considered as a central element of the global financial system, and a strategic element for corporations and societies around the world. Financial innovations address numerous societal needs such as: promote financial and economic resilience; safeguard savings and the integrity of financial contracts; facilitate efficient allocation of capital to support economic growth; enable payments and smoothing of cash flows and consumption over time; provide broad access to financial services products and services; financial protection, risk transfer diversification and effective markets and collect, analyze and distribute information for better economic decision-making.

## 2. FINANCIAL INNOVATION — DEVELOPMENT AND EXPANSION

Innovation has been a mark of the financial services industry since its inception. That financial innovation is not a new phenomenon and that it has a long history of evolution, and that their development is a continuous process is best evidenced by the finding presented in Table 1. This table offers a brief chronology of essential innovations in the history of banking and insurance, which can be linked to the essential functions of financial innovation and the financial services sector in general, most of which, over time, have been accepted as beneficial.

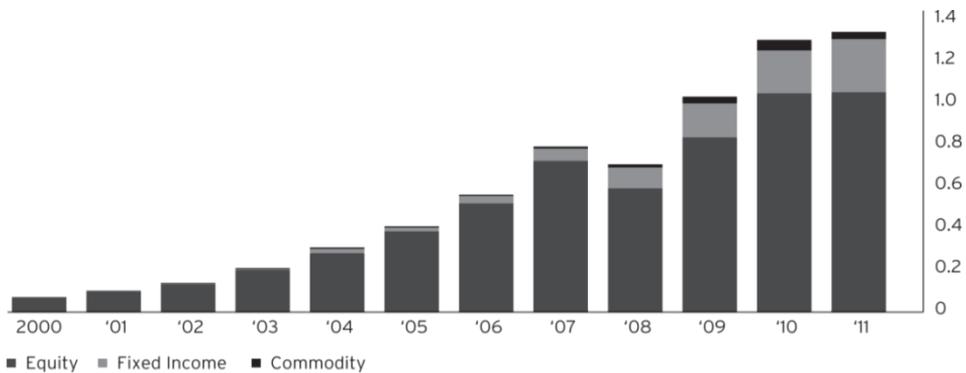
▶ **TABLE 1. EXAMPLES OF FINANCIAL INNOVATION OVER THE CENTURIES**

YEAR	INNOVATION
1600s	Publicly listed stock
	Standardized currency
	Fractional reserve banking (fiat money)
	Insurance brokerage
1700s	Futures (Japanese Rice Futures Market)
	Monopoly on issuing banknotes
	Insurance fund
	Check clearing house
	Mutual funds
1900s	Federal Reserve System
	First national deposit insurance scheme
	Secondary mortgage market
	Venture capital
	Hedge funds
	Early credit card (Diners Club International launches first multi-purpose charge card)
	Modern credit card (Bank of America launches credit card with revolving credit line)
	Repurchase agreements grow
	Automated teller machines (ATMs)
	Reverse mortgage
	Securitization (originate to distribute)
	ATMs operational
	Floating exchange rates
	Money market mutual funds
	Debit cards
	Foreign currency futures
	Black-Scholes model (Nobel prize winning option-pricing model helps launch modern derivatives industry)
	Point of sale terminals
	Automated clearing houses (ACH)
	CHIPS (same day settlement)
	Consumer online stock trading
	Stock index futures
	Automated underwriting
	Exchange-traded funds
	Public-private partnerships
	Credit default swap
	Value at Risk
	Weather derivatives
	Online payment service (PayPal launches online payments)
	2000s
High-Frequency Trading	
Continuous Linked Settlement	
Alternative Trading Systems, Multilateral Trading Facilities	
Target2-Securities	
Usage-based insurance	
Longevity bonds and swaps	

Source: adapted from: The Economist, World Economic Forum, Oliver Wyman

Financial innovation is gaining in importance as the markets for these instruments expand and become broader and more in-depth, for which the explosive growth of ETFs can be taken as an illustrative example. A striking example of the systemic importance of innovation is ETF's (Exchange-traded funds)<sup>2</sup> rapid growth (see Figure 1).

► FIGURE 1. EXCHANGE-TRADED FUNDS, ASSETS IN TRILLIONS



Source: Cognizant Reports (2012), p. 5

The increasing speed and sophistication of financial innovation is the result of globalization, rapid economic growth in the world, the development of new legal remedies, financial liberalization and deregulation, and technological advances, especially in the field of information and communication technologies (ICT). Financial innovation comes from technological advances and structural changes in the financial system, linked to a tendency to disintermediation, securitization, the emergence of new financial instruments, and increased economic wealth.

With the introduction of more and more modern information technology, there has been an increase in financial innovations in banking, which enabled banks to develop more efficient methods and instruments for mobilizing free financial resources. However, at the same time, as a result of financial innovations, a process of banking disintegration was created, i.e., the share of banks in the transfer of financial surpluses between financially-surplus and financial deficit sectors and transactors has been reduced. The development of the capital market and the emergence of financial innovations have led to the “disappearance” of traditional banking and the development of alternative ways of financing entrepreneurial ventures.

Some of today's most significant innovations include:

**1. Cryptocurrency diversification** is a digital asset designed to work as a medium of exchange that uses strong cryptography to secure financial transactions, control the creation of additional units, and verify the transfer of assets. Cryptocurrencies are character-

<sup>2</sup> An exchange-traded fund (ETF) is a type of security that involves a collection of securities—such as stocks—that often tracks an underlying index, although they can invest in any number of industry sectors or use various strategies. ETFs are in many ways similar to mutual funds; however, they are listed on exchanges and ETF shares trade throughout the day just like ordinary stock. See: <https://www.investopedia.com/terms/e/etf.asp>

ized by the fact that they are not issued by the central authority and usually do not exist in physical forms, like paper money. Some of the cryptocurrencies are also recognizable by decentralized control, which is in contrast to the centralized digital currency and the central banking system. Cryptocurrencies are probably the most well-known adoption of blockchain technology. An illustrative example of a country that widely accepts the use of cryptocurrencies is Switzerland, which has even provided special financial incentives for start-ups that conduct their business operations in the country. The concept of cryptocurrency may be the future of the financial industry, but there is indeed more need for transparency, safety, and stringent regulatory standards for worldwide acceptance.

2. **Blockchain** can be described as a data structure that holds transactional records and while ensuring security, transparency, and decentralization<sup>3</sup>. You can also think of it as a chain of records stored in the forms of blocks which are controlled by no single authority. Blockchain technology enables electronic transactions that are resilient even when large amounts of money are at stake<sup>4</sup>. Blockchain is a distributed ledger technology that can be used to execute, store, and verify transactions of every kind (money transfer, buying and selling stocks, insurance contracts, and buying and selling physical goods or energy). Blockchain contributes to the advancement of security of financial transactions, decentralize services, improve speed to market for new products, it can be used to securely store client identities or handle cross-border payments, and it could even lead to “smart contracts” that complete trades and deals automatically.

3. **Near-field communication (NFC)** is a short-range wireless connectivity standard (Ecma-340, ISO/IEC 18092) that uses magnetic field induction to enable communication between devices when they are touched together or brought within a few centimetres of each other<sup>5</sup>. NFC devices can act as electronic identity documents and key cards. They find their application in contactless payment systems. They allow mobile payment replacing or supplementing systems such as credit cards and electronic ticket smart cards. NFC has already changed the way we make payments. In many countries, it is used to enable contactless payments, where users can only place their card on the reader. The technology is also built into state-of-the-art smartphones and can even be built into the body, so users can pay for their coffee literally with the waves of their hands. Of course, it is a long way to a situation where users will walk with financial implants. Still, it will be interesting to see new ways that we can use the technology in the future – especially with more and more similar devices entering the market.

4. **ATMs that do not require a payment card** – At a time when the banking industry is on the brink of another FinTech revolution, this type of ATM will become widespread, and its main advantage is that you do not have to worry about losing your card or forgetting your PIN. Secure ATMs also offer protection against stolen wallets. Secure ATMs are safer than traditional ATMs. With the growing prevalence of “skimmers” – devices that can record personal data while users put an item in an ATM – the new system avoids such fraud. However, banking systems still do not offer fully modernized new ATMs. Currently, they simply allow consumers to enter a code received via SMS to withdraw a predetermined

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3 <https://medium.com/hackernoon/blockchain-technology-explained-introduction-meaning-and-applications-edbd6759a2b2>

4 <https://cacm.acm.org/magazines/2020/1/241715-blockchain-technology/fulltext>

5 <https://r2.community.samsung.com/t5/Tech-Talk/What-is-a-NFC-Technical-Details/td-p/2526817>

amount of cash. But they are an essential first step towards a future that eliminates all physical instruments from the banking world.

5. **Robo-advisors** are digital platforms that provide automated, algorithm-driven financial planning services with little to no human supervision<sup>6</sup>. A typical robo-advisor collects information from clients about their financial situation and future goals through an online survey and then uses the data to offer advice and automatically invest client assets. The best robo-advisors offer easy account setup, robust goal planning, account services, portfolio management, and security features, attentive customer service, comprehensive education, and low fees<sup>7</sup>. Thanks to speed and efficiency in organizing a customer's debt, tax affairs, and financial planning to tailoring investment portfolios, robo-advisors are making finance management easier and more accessible. Robo-advisors are also important due to the fact that they can help small investors without the steep cost of face-to-face advice, bearing in mind that, traditionally, expert financial advice has only been made available to the wealthy. According to OECD<sup>8</sup>: (1) Robo-advice platforms have the potential to increase the accessibility of investing to a broader market and to do so relatively more cheaply than through the traditional channels; (2) Robo-advice platforms have the potential to deliver financial advice that is objective, consistent and transparent; (3) However, the increased level of automation may require different approaches to ensure that the users have a sufficient level of understanding of the investments they are making; (4) Policymakers will need to ensure that existing legislation applies to robo-advisors concerning the applicability of duty of care requirements, avoidance of conflicts of interest, transparency of disclosure and access to redress in the case of an unfair outcome for the consumer, and (5) Regulators and supervisors will need to have processes in place to ensure that the algorithms that these platforms use are accurate and robust.

6. **Open APIs**, also called public API, is an application programming interface made publicly available to software developers<sup>9</sup>. Open APIs are published on the internet and shared freely, allowing the owner of a network-accessible service to give universal access to consumers. Open APIs help to foster an ecosystem for banks, software developers, and account holders, enabling banks to innovate and extend beyond their traditional service offer. The positive implications of open APIs are manifested in the reduction of corrupt practices, raising the level of trust and accountability, and encouraging financial transparency within the financial system.

7. **Big data analytics** is the process of collecting, organizing, and analysing large sets of data (called Big Data) to discover patterns and other useful information<sup>10</sup>. Analysts working with Big Data typically want the knowledge that comes from analysing the data. Customers expect a more personalized service from their banks, and big data analytics is also helping banks to tailor products to the individual needs of their customers. The problem for banks, however, is accessing that data, which very often is found in large disparate systems.

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6 <https://www.investopedia.com/terms/r/roboadvisor-roboadviser.asp>

7 <https://www.investopedia.com/best-robo-advisors-4693125>

8 OECD (2018), p. 83

9 <https://searcharchitecture.techtarget.com/definition/open-API-public-API>

10 [https://www.webopedia.com/TERM/B/big\\_data\\_analytics.html](https://www.webopedia.com/TERM/B/big_data_analytics.html)

8. **Peer-to-peer lending (P2P)** enables individuals to obtain loans directly from other individuals, cutting out the financial institution as the middleman<sup>11</sup>. P2P lending is also known as “social lending” or “crowdlending.” P2P is a process of debt financing that allows different individuals to borrow and lend money using an online platform. The quantity of interest charged for P2P loans is lower than compared to the traditional prime loans<sup>12</sup>. Investors get only a portion of the loan and spread the amount of the loan across many buyers. Using the latest technology, these platforms are famous for their speed and convenience, as well as the fact they often bypass regulation and can, therefore, offer better rates of interest. P2P cuts out the middlemen: banks and other financial intermediaries. At the same time, however, it can also expose users to greater risk – by lending directly, savers do not get the same protection as putting their money into a bank account.

### 3. CHARACTERISTIC FEATURES AND IMPORTANCE OF FINANCIAL INNOVATIONS

Financial innovations are described as the emergence of new financial products or services, new organizational forms, or new processes for more developed and complete financial markets that reduce costs and risks or provide an improved service that meets the particular needs of financial system participants. It includes institutional (e.g., new types of financial firms), product (e.g., new types of derivatives or securitized assets, among others), and process (e.g., online banking, phone banking, or other forms of information and communication technology applications) innovations.<sup>13</sup> There are a significant number of studies that have been addressed by studying the basic features of financial innovation.<sup>14</sup> Financial innovation has its own positive and negative sides. As benefits of financial innovation they are cited<sup>15</sup>: they are thought to be favouring the extension of access to credit; they might also reduce market frictions (such as the high costs of transacting some products (e.g., illiquid securities such as equities in non-public companies)); reducing or transferring risks; finance and grow the private economy; promote inclusiveness; increasing efficiency, access, and the customer experience; enhancing profitability; rebalance risk across sectors of the economy and stimulating financial development and growth. As negative sides of financial innovation, they are cited: they lead to volatility, macroeconomic imbalances, increased risks, increased possibility of default, they consumer disservice, lead to insolvency of institutions, generate systemic risk, lead to loss of market integrity.

Generally speaking, innovations have the potential to provide for a more efficient allocation of resources and, thereby, a higher level of capital productivity and economic growth.

11 <https://www.investopedia.com/terms/p/peer-to-peer-lending.asp>

12 <https://www.reportsanddata.com/report-detail/peer-to-peer-p2p-lending-market>

13 Dabrowski (2017), p. 4

14 see, for example: Radivojević, 2018; Coeckelbergh, M., DuPont, Q., Reijers, W., 2018; Gomber, Kauffman, Parker, Weber, 2018; Lerner, Tufano, 2011; Beck, Chen, Lin, Song, 2016; Frame, White, 2004; Saksonova, Kuzmina-Merlino, 2017; Jenkinson, Penalver, Vause, 2008; Dynan Elmendorf, Sichel, 2006; Dewi, Manurung, Warganegara, Rusmanto, 2019; Franklin, 2012).

15 see: Önder Hergüner (2015), p. 2; World Economic Forum (2012), p. 33, 39.

But, on the contrary, Blommestein<sup>16</sup> is talking about the so-called *risk paradox*: financial innovations resulting in potentially improved risk profiles of individual financial institutions and higher standards of living, on the one hand, with an increase in financial fragility and systemic risk, on the other. Indeed, increased volatility, greater interdependence, and new types of risks (e.g., wholesale funding risk associated with securitization, operational risk, tail risk, and counterparty risk related to the use of derivatives) have made the structure of the risk exposure of banks and other financial institutions more complex. Consider an example. Credit risk transfer instruments have gained importance over the past few years and triggered a debate on their possible implications for financial stability. With that in, the take-off of the market of *credit derivatives* (as innovative credit risk transfer instrument) is a testament to how financial innovation has been used to spread traditional risks. Derivatives are typically a contractual agreement between two parties in which one party is obligated to buy or sell the underlying security, and the other has the right to buy or sell the underlying security. Derivatives are financial instruments that have values derived from other assets like stocks, bonds, or foreign exchange, and very often used to hedge a position (protecting against the risk of an adverse move in an asset) or to speculate on future moves in the underlying instrument.

Hedging<sup>17</sup> is a form of risk management that is common in the stock market, where investors use derivatives called put options to protect shares or even entire portfolios. However, derivatives can take many forms, and some –like OTC derivatives – are complex and mostly traded by professionals rather than individual investors. On the other hand, many derivatives are listed on derivatives exchanges. They are standardized in terms of the quantities traded (size), expiration dates, and exercise (strike) prices<sup>18</sup>. Derivatives can be used to mitigate the risk of economic loss arising from changes in the value of the underlying. This activity is known as hedging. Alternatively, derivatives can be used by investors to increase the profit arising if the value of the underlying moves in the direction they expect. Derivatives contracts help in reducing risk by transferring the risk associated with the underlying asset to the party willing to take that risk. Some of the risks are Credit risk, Liquidity risk, and market risk. All the derivatives instruments are very easy to operate, they are low-cost financial products and financial instruments that aim to increase returns and reduce risk. They provide a diversification channel for investors to protect themselves from the vagaries of the financial markets. You can use the derivatives market to raise funds using your stocks.

On the other hand, derivatives and their use generate a number of risks, which is due to large losses because of leverage and borrowing. Derivatives can generate the following types of risks: 1. market risk (as investment decisions are made based on projections and technical analysis of probable outcomes, everyone is vulnerable to market fluctuations and shifts that reduce the likelihood that the investment will be profitable due to possible miscalculation of risk/reward ratio of potential losses against potential gains); 2. counterparty credit risk (occurs when there is a failure to perform a contract committed by one of the parties involved in the trade in derivatives – buyer, seller or dealer. This risk is more likely to occur in over-the-counter, or OTC markets which are unlike regular trading exchange where margin deposits are required for contract execution that are adjusted

16 see: Blommestein (2012).

17 Hedging refers to the practice of reducing or fully eliminating the risk associated with holding a volatile asset. If used properly, hedging transactions can take a lot of worry and stress out of investing.

18 <https://www.investopedia.com/ask/answers/052615/how-can-derivatives-be-used-risk-management.asp>

daily through the mark-to-market process which makes pricing derivatives more likely to accurately reflect current value); 3. liquidity risk (it is initiated by the behaviour of investors who seek to close out a derivative trade prior to maturity. Investors in derivatives are required to consider if it is difficult to close out the trade or if existing bid-ask spreads are so large as to represent a significant cost), and 4. interconnection risk (refers to how the interconnections between various derivative instruments and dealers might affect an investor's particular derivative trade. A number of investors are concerned about the possibility that problems with just one party in the derivatives market, such as a major bank that acts as a dealer, might lead to a chain reaction or snowball effect that threatens the stability of financial markets overall). The catastrophic consequences of the misuse of derivatives were best expressed during the financial crisis of 2007–2008. As an instrument of speculation, derivatives are a highly volatile financial instrument that carries the potential for large losses. Derivatives are characterized by a high inherent risk that is manifested in a highly sophisticated contract design that makes adequate valuation extraordinarily complicated and sometimes even impossible. Having the above discussion on the advantages and disadvantages of using derivatives, the key thing is proper supervision of these financial innovations because its absence could lead the financial market into disorder, chaos, and confusion and might destroy the entire nation's economy.<sup>19</sup>

Although governments and regulators tend to negatively view financial innovations, arguing that they are primarily designed to avoid taxation and to counter regulatory compliance, at the same time we should keep in mind that digitalization in the financial sector can greatly improve its efficiency, increase confidence in it, provide better risk management, provide greater value for clients, improve allocative efficiency, ensure a higher level of capital productivity and the quality and diversity of banking services, and to enable diversification of risk. In order to mitigate the negative impact of financial innovation, it is crucial to have adequate regulation and supervision, which should have as its objectives: i) promoting the stability of the financial system, avoiding systemic risk, bank runs and the malfunctioning of payment services; ii) maintaining the safety and solvency of banks; iii) protecting consumers of financial services, and iv) improving efficiency and competition in the system<sup>20</sup>. To create a regulatory framework that is appropriate for the new financial environment, financial authorities need to keep in mind the following things<sup>21</sup>:

- Cybersecurity
- Data protection – financial authorities may need to consider the interaction of personal data protection frameworks with existing regulations, even if they do not have formal attributions in these matters.
- Competition – the creation of an environment in which competition can thrive sometimes requires the involvement of financial authorities, which are considering promoting mechanisms among innovative firms to guarantee interoperability, avoid anticompetitive practices and contribute to effective payment system oversight.
- Coordination among financial authorities – cooperation between different bodies (not only financial authorities, but also other authorities in charge of consumer protection, cybersecurity, data protection, tax revenue or competition financially) can be signifi-

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19 <https://corporatefinanceinstitute.com/resources/knowledge/tradinginvesting/derivatives/>

20 [https://www.bde.es/ffweb/bde/GAP/Secciones/Publicaciones/InformesBoletinesRevistas/RevistaEstabilidadFinanciera/17/MAYO%202017/Articulo\\_GonzalezParamo.pdf](https://www.bde.es/ffweb/bde/GAP/Secciones/Publicaciones/InformesBoletinesRevistas/RevistaEstabilidadFinanciera/17/MAYO%202017/Articulo_GonzalezParamo.pdf)

21 see: CEMLA FINTECH FORUM (2019), p. 25

cantly more useful in terms of a comprehensive approach to FinTech and, therefore, can achieve a more balanced and consistent regulatory outcome.

- International coordination – Given that innovation is not limited to one country, and the fact that FinTech companies provide services outside the domestic market, it is necessary to harmonize regulatory frameworks between different countries, all through international coordination and cooperation (ranging from discussion and sharing of information forums among authorities, to memorandum of understanding and regional agreements.), thus avoiding regulatory arbitrage.

## 4. FINANCIAL INNOVATIONS IN THE ERA OF DIGITALIZATION — EMPIRICAL ISSUES

According to Toronto Financial Services Alliance<sup>22</sup> for financial innovation, it is useful to mention *current trends* which can affect them (positively or negatively) such as Brexit, Growth of Islamic Finance, Increased Central Bank Intervention, Increased Concern over Data Protection, Increased Regulatory Pressures, Increased Transparency in Asset/Wealth Management, Increased Use of Public-Private-Partnerships for Infrastructure Financing, Increased Volatility in Oil & Gas Finance, Internationalisation of Renminbi Trading and Slowdown in Economic Growth. Increased regulatory pressures and a general slowdown in economic growth are recognized as the most significant areas. In the fourth place, there is Brexit, which is seen as a global issue rather than one that just affects the UK and the EU. Nearly 70% of respondents thought that Brexit would have a negative or very negative effect on the competitiveness of London. Finally, TFSA (2017) asked respondents (finance professionals) to assess the *centres* on their ability to attract more FinTech activity in the future, and the main finding is that the top ten existing or potential FinTech clusters are situated within the following cities<sup>23</sup>: Berlin, Hong Kong, London, Montreal, New York, San Francisco, Singapore, Sydney, Tel Aviv, Toronto.

The 1<sup>st</sup> fully global FinTech index 2020 covering 230+ cities across 65 countries. The Findexable Global FinTech Index City Rankings report publishes for the first time the results calculated by our Index algorithm, which ranks the FinTech ecosystems of more than 230 Cities, 65 Countries, and 7000 FinTech companies. Table 2. shows FinTech's top 10 countries.

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22 Toronto Financial Services Alliance TFSA (2017), p. 6

23 Toronto Financial Services Alliance TFSA (2017), p. 30

▶ TABLE 2. FINTECH'S TOP 10 COUNTRIES

	RANK	STRENGTH	POPULATION	FINTECH CITIES IN TOP 100	LOCAL LOCAL FINTECH LEADERS	FINTECH INVESTMENTS	WIFI SPEED
USA	1	Payments, B2B fintech, Security	329 million	22	Stripe (val: \$22.5bn) Coinbase (\$8bn) Robinhood (\$5.6bn)	\$9.4bn (H1 2019)	#20
UK	2	Challenger banks, personal finance & wealth, lending, blockchain	67.5 million	3	TransferWise (val: \$3.5bn) Greensill (\$3.5bn) BGL Group (\$3bn)	\$2.29bn	#6
Singapore	3	Wealth management, digital banking, SME	5.8 million	1	TenX (val: US\$159.1m) Quoine (\$123m) KyberNetwork (\$105m)	\$735M	#12
Lithuania	4	Payments, lending, banking	2.8 million	1	Stockinvest us Coingate NEO Finance		#1
Switzerland	5	Cryptocurrency & blockchain, wealth management, crowdfunding	8.6 million	4	Avaloq Group Ethereum Numbrsa		#14
Netherlands	6	Digital payments, alternative lending, investment	17.1 million	2	Adyen, Ohpen, BUX		not in top 20
Sweden	7	Digital payments, SME, neobanks	10 million	1	Klarna, iZettle, Anyfin	\$736.7 m	#17
Australia	8	Digital payments, personal finance, alternative lending	25.3 million	2	Judo Capital, Airwallex, MoneyMe		not in top 20
Canada	9	Crypto and blockchain, lending, insurance	37.5 million	5	Carta, Borrowell, Wave		#19
Estonia	10	Digital payments, personal finance, alternative lending	1.3 million	1	Fortumo, Veriff		#3

Source: The Global FinTech Index 2020 FINDEXABLE THE GLOBAL FINTECH INDEX CITY RANKINGS REPORT, available at [https://findexable.com/wp-content/uploads/2019/12/Findexable\\_Global-Fintech-Rankings-2020exSFA.pdf](https://findexable.com/wp-content/uploads/2019/12/Findexable_Global-Fintech-Rankings-2020exSFA.pdf)

The digital transformation is now sweeping the financial services industry. It is evident that technology is affecting financial services in a multitude of ways. Ten competitive technology-driven influencers for 2020 include<sup>24</sup>:

1. FinTech will drive the new business model – Strong and huge financial institutions are being established known as “incumbents” whose main advantages are in their size and network multiplier effect, and they also have an extensive clientelistic base and possess resources that guarantee their progress even in gloomy economic conditions.
2. The sharing economy will be embedded in every part of the financial system – refers to decentralized asset ownership and using information technology to find efficient matches between providers and users of capital, rather than automatically turning to a bank as an intermediary. Financial institutions should seriously consider sharing economy opportunities such as partnerships with digital intermediaries or even end-users with an eye towards how they might deliver services at much lower costs.
3. Blockchain – The emergence of blockchain could make the financial services industry’s infrastructure much less expensive and make the list of potential uses is almost limitless, from financial transactions to automated contractual agreements and more. In the next five-year period, transaction volumes and associated profit pools shifting from intermediaries to the owners of new and highly efficient blockchain platforms are expected. These transactions could include transferring digital or physical assets, protecting intellectual property, and verifying the custody chain.
4. Digital becomes mainstream – Thanks to digitalization, i.e., the development of the internet and considerable investments in technology, there has been an increase in the level of efficiency of operations within the financial system. The new digital wave that has flooded the financial system brings with it a new digital agenda that extends from customer experience and operational efficiency to big data and analytics. In contrast, in the field of financial services, it has found its application in the field of retail banking, wealth management, payments, and insurance, with a shift in focus to new institutional arenas such as capital markets and commercial banking.
5. “Customer intelligence” will be the most important predictor of revenue growth and profitability –Instead of the former reliance of customer intelligence on some relatively simple heuristics (used to be based on built from focus groups and surveys), the development of technology has provided financial institutions with far more data on what basic customer needs are and what they actually want. In order to create the right offer, financial institutions must keep in mind that consumer decisions are no longer straightforward and that consumers tend to build wealth as a result of owning a small business, investments, or real estate; they turn to social networks for content, product reviews, opinions and referrals and they look for opportunities to improve their financial “health.” Due to the growing consumer sophistication, there is a strengthening of price competition and pressure on costs, which is why financial institutions are forced to use adequate technology and tools to anticipate risks and consumer demands, which includes big data analytics, sensor technology, and the communicating networks. Financial institutions have already started using artificial intelligence (AI), machine learning, and customer analytics to collect data on consumer behaviour, choices, and preferences and to perform services that are far more personalized, where even during the next decade, the direct participation of clients in the provision of financial services can be expected.
6. Advances in robotics and AI will start a wave of “re-shoring” and localization – In the coming five-year period, we should rightly expect the transition from sporadic use of robotics and AI, machine learning and pattern recognition to full integration into a company’s business-as-usual activities, which will facilitate the process of addressing key pressure points, reduce costs and amortize business risk. They are targeting a

specific combination of capabilities such as social and emotional intelligence, natural language processing, logical reasoning, identification of patterns and self-supervised learning, physical sensors, mobility, navigation, and more. The previously mentioned trend is a warning for financial institutions to implement new technological solutions in their business as soon as possible and to find and integrate as many competent industrial engineers as possible into their personnel plans and programs.

7. The public cloud will become the dominant infrastructure model –Thanks to the cloud-based infrastructure, data storage costs have been reduced, which has relaxed big data management, facilitated the application of sophisticated analytics and reduced the barriers to entry for new FinTech disruptors. To illustrate, conventional banks provide the payment infrastructure of many industrial, healthcare, and smaller FinTech institutions. These banks are selling their infrastructure as a service to others, and leveraging the cloud to do it, and this provides an essential source of revenue to these institutions. However, shifting from an on-premises model to a cloud-based model is not without challenges, and one of the most serious is reflected in regulatory barriers given that some countries have introduced significant restrictions on the transfer of client data to the public cloud. In this regard, many financial institutions today are forced to adopt a private cloud solution.
8. Cyber-security will be one of the top risks facing financial institutions –Cyber-security is the leading challenge to the adoption of IoT technology because insecure interfaces increase the risk of unauthorized access. Here are some of the concerns: (1) Attack surface: Hackers can gain entry to a corporate network through an IoT device; (2) Perimeter security: IoT technology relies on cloud-based services, so it will be challenging to implement effective perimeter defences; (3) Privacy concerns: The pervasiveness of IoT data collection coupled with advanced analytic capabilities could potentially result in consumer privacy violations and (4) Device management: Many IoT devices currently do not support the implementation of strong security controls, and maintaining a security baseline will only get harder as IoT devices proliferate. Financial institutions can monitor the threats mentioned above through the use of big data analytics, which helps them to identify evolving external and internal security risks and react much more quickly. Concerning cyber-security, in the coming period, the challenge will be to balance safety with customer convenience. With a risk-based framework, companies can communicate and collaborate as necessary, decide how to design, monitor, and measure their cyber-security goals, and keep their data safe.
9. Asia will emerge as a key center of technology-driven innovation –China now has the world's largest peer-to-peer (P2P) lending market, and has more mobile smartphone users than any other country in the world. Projections are that over the next thirty years, some of the 1.8 billion people will move to cities, mostly in Africa and Asia, which represents a huge business opportunity for financial institutions. At the same time, advances in information and communication technologies create an opportunity for Western companies to offshore certain support functions to places like the Philippines and India, creating relatively well-paid jobs. This leads to a causal mechanism towards the increased number of jobs created in cities (trend of urbanization), leading to the strengthening of technological infrastructure in cities that acts as a magnet for employers who are now able to serve global markets. On the other hand, there is rapidly a growing middle class which initiated higher consumption: scooters, televisions, mobile phones, and more. Concerning Asia-Pacific countries, it is well-known that they are with the world's largest middle-class growth, which further means that

in these countries, the highest demand is for technology-driven innovation. There are other demographic shifts to support this growth. Asia has a comparatively young population of “digital natives,” the post-millennials who have grown up in a world in which digital technology was already prevalent. Asia also has the largest inter-connectivity of flows with other emerging economies, and an average GDP growth that outperforms its peers in the West. As consumption grows, people become more sophisticated buyers of services, and they learn to continuously evaluate the price vs. value equation. For consumer-oriented companies, including those in financial services, any “free ride” in the Asia-Pacific countries is now over; they will need to rely on technology innovations to get and keep customers.

10. Regulators will turn to technology as well –In addition to financial institutions, regulators themselves need to take into account the fast-growing technology and its implications as a systemic trend. They also hope to monitor the industry more effectively and to predict potential problems instead of regulating after the fact, for which examples of this include the supervisory procedures and data requests tied to ‘stress tests,’ asset quality reviews and enhanced reporting requirements coming out of Washington, London, and Basel. Using sophisticated analytical tools on large volumes of data, regulators can compare scenarios and address potential issues before they become full-scale market problems.

Concerning financial innovation, it is useful to note the growing importance of the FinTech industry developed by specialized start-up finance firms that aim to differentiate themselves from bank activities using digitization and big data transfer techniques, which could significantly contribute to strengthening non-banking finance as a substitute for traditional finance of commercial banks. FinTech (financial technology) is a coin that captures all the innovations and modern technological solutions that directly compete with the traditional financial services sector<sup>25</sup>. The broader definition of FinTech includes products such as cryptocurrency, online crowdfunding platforms, new banking, robotic consultants that provide financial advice using investment algorithms, software that makes “smart contracts” between the two parties, and many other services<sup>26</sup>. FinTech is both the fastest growing IT branch and the segment with the highest number of start-ups<sup>27</sup>. The main comparative advantage of FinTech over the traditional financial industry is providing financial services more readily to the general public, being simultaneously less expensive and much quicker<sup>28</sup>. The collaboration between FinTech companies and banks and financial institutions initially viewed as competitors, boosted the development of the segment worldwide<sup>29</sup>. Figures 2 shows the distinction, in terms of key attributes between FinTech and non-FinTech firms within the financial services industry. It can be seen that while FinTech firms revenue currently represents a small share of the overall revenue of the financial services industry, their growth and contribution to innovation is indisputable.<sup>30</sup>

25 <https://bif.rs/2018/04/fintech-u-srbiji-savladavanje-regulatornih-prepreka/>

26 <https://bif.rs/2018/04/fintech-u-srbiji-savladavanje-regulatornih-prepreka/>

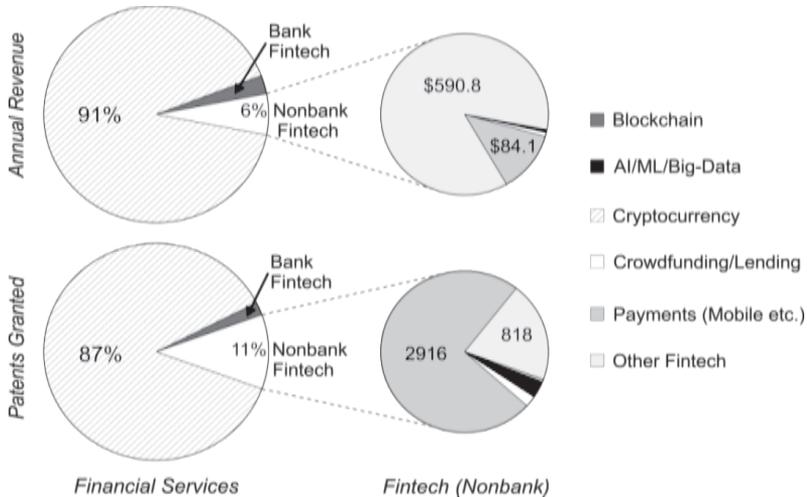
27 <https://cdn.seenews.com/reports/SeeNews%20FinTech%20Industry%20Report,%202018.pdf>

28 <https://www.jp.m.rs/wp-content/uploads/2018/05/FinTech.pdf>

29 <https://cdn.seenews.com/reports/SeeNews%20FinTech%20Industry%20Report,%202018.pdf>

30 IMF (2019).

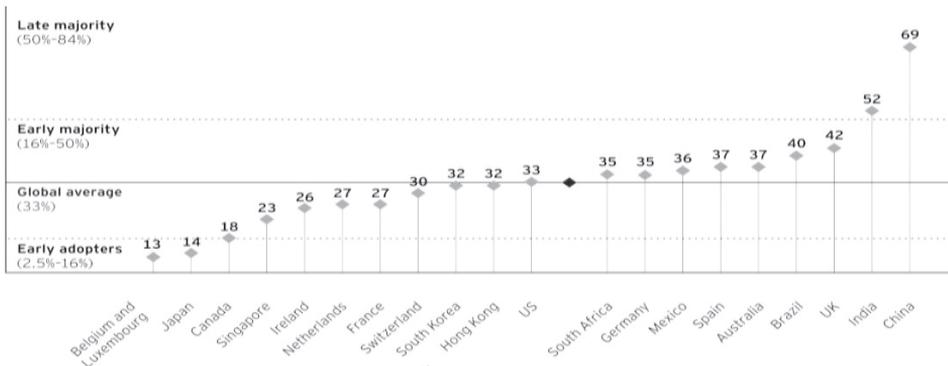
▶ FIGURE 2. GLOBAL FINTECH AND FINANCIAL SERVICES—REVENUE, PATENTS  
(Activity Distribution, in Billions of US dollars, and Number of Patents)



Source: INTERNATIONAL MONETARY FUND (2019)

The basic endeavour FinTech industry is to make financial services more affordable for both consumers and businesses. There is a belief that the FinTech industry will contribute to greater financial inclusion and better access to credit by consumers and small and medium-sized enterprises (SMEs), and reducing transaction costs and a more diverse and resilient financial system. FinTech industry had grown rapidly and had “achieved initial mass adoption,” and FinTech companies are becoming globally recognized and that at levels that can influence industry standards and consumer expectations (see: Figure 3).

▶ FIGURE 3. PROGRESS OF FINTECH ADOPTION GLOBALLY AND ACROSS 20 MARKETS



Notes: The figures here show global adoption rates for 2017, including adoption rates for each of the 20 markets, plotted against stages of the innovation adoption curve. All figures are shown in percentages.

Source: EY FinTech Adoption Index 2017, The rapid emergence of FinTech, p. 12

For *Global FinTech Adoption Index 2019*, it was interviewed more than 27,000 consumers in 27 markets across six continents, to get a global understanding of FinTech adoption trends between markets, demographic groups, and over time. FinTech services are grouped into five categories—money transfer and payments, budgeting and financial planning, savings and investment, borrowing, and insurance. Respondents indicated if they were aware of these services and if they use them. Consumer awareness of FinTech services is high across all categories, but particularly in relation to money transfer and payments services (96%), which can be seen in the following table.

▶ **TABLE 3. CONSUMER AWARENESS OF FINTECH SERVICES IN EACH CATEGORY**

	AWARE	NOT AWARE
Money transfer and payments	96%	4%
Budgeting and financial planning	71%	29%
Savings and investments	78%	22%
Borrowing	76%	24%
Insurance	86%	14%

Notes: The figures refer to the percentage of respondents who indicate they were not aware and have not heard of any services for that category

Source: adapted from *Global FinTech Adoption Index 2019*, As FinTech becomes the norm, you need to stand out from the crowd, available at <https://fintechausensus.ey.com/2019/Documents/ey-global-fintech-adoption-index-2019.pdf>, p. 9

Table 4 represents that the adoption of FinTech is driven by greater use of all of the above categories, whereby the most commonly used category is money transfer and payments, with 75% of consumers using at least one service in this category in 2019.

▶ **TABLE 4. COMPARISON OF FINTECH CATEGORIES RANKED BY ADOPTION RATE FROM 2015 TO 2019**

	2015	2017	2019	RANK
Money transfer and payments	18%	50%	75%	1
Savings and investments	17%	20%	34%	2
Budgeting and financial planning	8%	10%	29%	3
Insurance	8%	24%	48%	4
Borrowing	6%	10%	27%	5

Notes: The table shows the average percentage of respondents who reported using one or more FinTech services in that category. Data for 2015 differs from that originally published to align with the 2017 categorization and averaging methodology.

Source: adapted from, *Global FinTech Adoption Index 2019*, As FinTech becomes the norm, you need to stand out from the crowd, available at <https://fintechausensus.ey.com/2019/Documents/ey-global-fintech-adoption-index-2019.pdf>, p. 10

The most commonly used services in this category are peer-to-peer payments, non-bank money transfers, and in-store mobile payments. Insurance also records significant adoption compared to 2015, with 48% of consumers globally using a premium comparison site, feeding information into an insurance-linked smart device, or buying products such

as peer-to-peer insurance in 2019. However, the high level of adoption of FinTech services in all categories does not automatically mean that markets are saturated as a whole, so the most significant potential for further growth is in the areas such as budgeting and financial planning, and savings and investment services, where exists demographic groups whose adoption rates for these categories are still relatively low, such as women, consumers in rural areas, and consumers without university degrees. 2019 Global FinTech Survey, *Crossing the lines: How fintech is propelling FS and TMT firms out of their lanes* shows that financial services (FS) executives have different ideas about what type of FinTech will drive change. Still, they have similar struggles in executing their digital transformation strategies. More than half of FS leaders believe artificial intelligence (AI) will create the most significant change in how financial services are delivered over the next two years (see: Table 5).

▶ **TABLE 5. TECHNOLOGIES THAT TRANSFORM THE DELIVERY OF FINANCIAL SERVICES**

Internet of Things (IOT)	36%
Artificial intelligence	56%
5G	39%
Cloud	43%
Big data	44%
Blockchain	40%
Robotic process automation	31%
Voice technology, including natural language processing	29%
Biometrics identity management	28%

Note: Q: In your opinion, which technologies are set to transform the way financial services are delivered within the next two years? The question refers to FS Technologies leaders, all FS respondents (248), Don't know (0%)

Source: PwC Global Fintech Survey 2019, p. 6

The importance of the FinTech industry is expected to continue to grow in the future, with financial innovations driven by the digitalization process and the development of information and communication technologies to have significant repercussions both in terms of *financial stability and monetary policy*. Financial innovation creates an environment of uncertainty within the economic environment in which central banks operate and thus influence the creation of monetary policy. The most significant monetary effects of financial innovations are: 1) the increased role of interest rate exchange rates as monetary policy transmission mechanisms, which indicates the increased importance of price mechanisms in the transmission of monetary impulses in relation to classical loan quantities; 2) increasing the instability of the relationship between monetary variables and economic activities (given that the application of financial innovations affects the increase in the speed of money circulation, there is an increase in short-term instability in demand for transaction money); 3) increased use of flexible interest rates; 4) increase in relative significance securities markets (as a consequence of the application of financial innovations is the strengthening of the securities market, and thus strengthen the direct credit relations between creditors and debtors); 5) reduction of financial market segmentation (by their influence on the reduction of financial market segmentation, financial innovations have an impact and to delete some differences between banking and non-banking

institutions. Therefore, it is necessary to regulate the financial market by acting on credit demand); 6) increased globalization of the financial market (financial innovations erase both spatial and temporal boundaries between national financial markets, and this, of course, leads to the globalization of financial markets); 7) increased micro-efficiency of financial markets with an increase in systemic risks and instability, which leads to the disappearance of the difference between money and other assets and thus may jeopardize the stability of the microsystem. Financial innovations influence monetary policy by determining the functioning of transmission mechanisms. Overall, it is believed that financial innovation tends to strengthen the interest rate channels [through a) fostering dissemination of information and its more rapid incorporation into financial market prices and b) increased holding of financial assets by lowering transaction costs and facilitating arbitrage, hedging, funding, and investment strategies] and exchange rate channels [through a contribution to greater integration of the international and domestic financial markets, which results in less sensitivity to interest rate differentials between currency areas]. On the other hand, it appears that financial innovations tend to weaken the credit channel because it gives firms broader access to securities markets, which may reduce information asymmetries at the source of the credit channel, and through securitization by banks which can reduce their liquidity constraints. A non-negligible part of FinTech products focuses on payment services or fund intermediation services (P2P lending, payments via smartphones, and virtual currencies) have a substantial impact on monetary aggregates (M1, M2, and M3). This is explained by the fact that the demand for official banknotes and coins in circulation may decrease and gets substituted with alternative means of payment, which results in a decline in the representation of money and credit supply in the economy, and destabilization of money demand, which together makes it difficult to anticipate inflationary risks in the economy. Recently, it has been pointed out that privately issued digital currencies bring with them a significant potential to strengthen currency competition, which may have the fundamental outcome of monetary policy discipline, as well as a core change in the current fractional reserve system (through substitution bank deposits as the main form of money holding of households and businesses) that would raise the stability of the existing financial system<sup>31</sup>. "Increased instability of monetary aggregates and credit supply would be a possible outcome if market participants shifted liquidity pro-cyclically between digital money and bank deposits. Commercial banks would increasingly have to rely on other funding sources than deposits so that this disruptive change to the fractional reserve system could finally pave the way for a more stable financial system. If central bank digital money were to replace cash as well, then central banks would gain the ability to reduce interest rates below the current effective lower bound, provided entry of competitors is restricted."<sup>32</sup> Finally, financial innovation complicates monetary analysis and operational procedures on the financial market, making monetary policy effective only in the short term.

Financial innovations, as a catalyst for structural change in the financial system, also have significant implications for financial stability, as risk is much more widespread, but transparency is reduced as to where risks are located. On the one hand, financial innovations can create financial stability because they enhance market efficiency by reducing transaction and financial intermediation costs and facilitating arbitrage, hedging, funding, and investment strategies and it can serve as a catalyst for providing new solu-

31 see: European Parliament (2017)

32 EUROPEAN UNION (2017), p. 19

tions to long-standing problems, including financial exclusion, the quality of consumer decision-making, agency costs at the front-end of financial services, and high compliance costs. On the other hand, financial innovation also brings new risks due to the fact that financial innovations not substantially improved capital allocation because financial services remain expensive, and the financial sector chronically lacks competition. Financial innovations like derivatives and securitization have essential roles in risk management and financial resource allocation, yet they also played a key role in facilitating the Global Financial Crisis. Having in mind the above, the key challenge for financial innovation regulators is the optimal balance between innovation, financial stability, and consumer protection<sup>33</sup>. FinTech can enhance financial stability by providing a better client experience to reducing friction, strengthening critical infrastructure components, increasing access to the financial system, realizing efficiencies, and reducing costs for market participants and the investing public. On the other hand, FinTech may weaken financial stability due to exacerbating cybersecurity threats or amplifying third-party risks, and through disintermediation of incumbents and disaggregation of financial services and decentralization of networks<sup>34</sup>.

At the same time, FinTech is believed to have the potential to support and undermine financial stability. The transmission channels through which financial innovations support financial stability are summarized in Table 6.

▶ **TABLE 6. MAIN BENEFITS TO FINANCIAL STABILITY**

POTENTIAL BENEFIT	LINK TO FINANCIAL STABILITY
Decentralisation and diversification	Decentralisation and diversification in the financial system can dampen the effects of financial shocks in some circumstances. Failure of a single (or type of) institution is less likely to shut down a market as there would be other (types of) providers of financial services.
Efficiency	Efficiency in operations, including through incentives created by contestability, supports stable business models of financial institutions and contributes to overall efficiency gains in the financial system and the real economy.
Transparency	Transparency reduces information asymmetries and enables risks to be more accurately assessed and better priced. It can further foster the creation of financial instruments with exposure to specific risks, completing markets and improving market participants' ability to manage risk.
Access to, and convenience of, financial services	Access to, and convenience of, financial services affects the financial inclusion of households and businesses, including SMEs. This is important for supporting sustainable economic growth and providing a diversification of exposure to investment risk.

Source: FINANCIAL STABILITY BOARD (2017), p. 13

The transmission channels through which financial innovation undermines financial stability are summarized in Tables 7 and 8, which address two basic components: (1) microfinancial risk (concerns the vulnerability of individual firms, financial market infrastructures (FMIs) or sectors to shocks); (2) macrofinancial risk (concerns the vulnerability of the entire financial system that increases the likelihood of overall financial instability).

33 For a broader discussion see: Arner, Zetsche, Buckley, Barberis (2017).

34 see: DTCC (2017), p. 7

▶ **TABLE 7. MICROFINANCIAL RISKS**

POTENTIAL RISK	LINK TO FINANCIAL STABILITY
<b>Financial sources</b>	
Maturity mismatch	Occurs when a loan is extended for a longer period than the financing is contracted for, creating rollover risk. Systemic impacts could arise if the sector provides critical functions or services.
Liquidity mismatch	Arises when assets and liabilities have different liquidity characteristics, resulting in “run risk” and the need to liquidate quickly relatively illiquid assets (fire sale), disrupting markets.
Leverage	Higher leverage implies less equity available to absorb any losses materialising from the realisation of market, credit, or other risks. Potentially exposes systemically important counterparties to losses.
<b>Operational sources</b>	
Governance/ process control	Poor governance or process control can lead to increased risk of direct disruption in provision of financial services or critical infrastructure.
Cyber risks	The susceptibility of financial activity to cyber-attack is likely to be higher the more the systems of different institutions are connected
Third-party reliance	Systemic risks may arise when systemically important institutions or markets are reliant on the same third parties.
Legal/ regulatory risk	Legal/regulatory risk may be greater when activities are evolving, or where regulatory arbitrage is sought. Uncertainty around liability for losses may be particularly damaging to confidence in the system
Business risk of critical FMI	FMI may be vulnerable to external factors that could adversely impact its balance sheet, and, consequently, lead to a withdrawal of financial services, impairing its function as a critical infrastructure.

Source: FINANCIAL STABILITY BOARD (2017), p. 14

▶ **TABLE 8. MACROFINANCIAL RISKS**

POTENTIAL RISK	LINK TO FINANCIAL STABILITY
Contagion	Distress experienced by a single financial institution or sector can be transmitted to other institutions or sectors – owing either to direct exposures between them, or commonalities that lead to a general loss of confidence in those institutions or sectors.
Procyclicality	Market participants can act in a way that exacerbates the degree and impact of fluctuations in economic growth and market prices over the short and/or longer term. Examples include: the excess provision of credit by banks during upswings in the economy, and the extreme degree of deleveraging that tends to take place once the economy turns into a downswing and capital positions are threatened; the low pricing of risk in financial markets during good times, and the high risk premia demanded by investors during bad times.
Excess volatility	The financial system can overreact to news. This can lead to adverse outcomes if, for example, any such overreaction creates solvency or liquidity problems that can spiral through the financial system, impairing the functioning of asset and credit markets. This is most likely to occur when there is homogeneity of business models or common exposures.
Systemic importance	Entities that are viewed as being systemically important (or too highly connected to fail) may amplify risks through moral hazard. For example, they may be more inclined to take on excessive risk, given that the downside to doing so may be limited by the implicit guarantee of public support. Predatory pricing of services could also stifle competition (“the winner takes all”), reducing the likelihood of other service providers stepping in when the entity suffers distress.

Source: FINANCIAL STABILITY BOARD (2017), p. 15

FinTech market size is unfortunately dwarfed by the governmental regulations with stringent rules that confine the operability of FinTech applications. Furthermore, there is a perceptible lack of “human touch” in these applications, which is sometimes coupled with the extra convenience charges applicable to the transactions, and it’s quite evident by the fact that a lot of accounts made on FinTech mobile applications are dormant. However, future foresees less stern government rules, advanced data security, and increased preference for FinTech applications by the people, which will drive the growth in the demand for the same. The last tendency in the set of financial services trends is the concern of cyber-security. Although FinTech provides financial players with more opportunities, it also makes them more vulnerable to cyber-attacks. The major security-related issues are data tampering, the loss and theft of financial records, hacking into personal accounts and profiles, malware intrusion, inadequate CDD<sup>35</sup>, and AML<sup>36</sup> (Anti-Money-Laundering) checks and the misuse of the cloud environment.

For the FinTech industry, regulatory clarity is crucial, that is, optimal FinTech regulation, which stimulates providers to implement new technologies without at the same time increasing the vulnerability of the financial system or eroding consumer protections.

Regulatory sandboxes proactively reduce regulatory constraints on innovative financial products and services and can be highly valuable to financial services institutions by:

- Reducing the time and cost of getting innovation to market
- Giving innovators greater access to finance by reducing risks of client adoption and increasing returns on capital investment
- Enabling innovators to work with regulators to ensure new development of technology and business models aligns with regulations

To make the most of this increasingly collaborative regulatory environment established financial institutions looking to harness FinTech innovation should<sup>37</sup>:

- Understand where and how to partner with regulators – consider the developing sandbox environment in your current and prospective markets.
- Begin working with regulators early – firms able to work with regulators to navigate and define the regulatory boundary will gain a first-mover advantage.
- Develop a global view beyond your home market – understand how local regulations and approaches may change based on overseas developments.
- Prepare for cross-country collaboration – decide how your solution can be scaled across borders in the design phase as regulators work more closely as they draft FinTech regulations and best practice guidelines.
- Partner with FinTech start-ups – some of the best early sandbox results have come from established financial institutions partnering with FinTech start-ups to verify new business models.

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35 Customer Due Diligence or CDD, is the process where relevant information about the customer is collected and evaluated for any potential risk for the organization or money laundering/terrorist financing activities. See: <https://sumsub.com/blog/customer-due-diligence/>

36 A money laundering risk is a probability that the business will unwittingly engage in money laundering or financing of terrorism.

37 EY (2017), p. 23

- Get ready for sandbox testing – streamline the decision-making process across departments to improve agility. Ensure you have the right resources in place to support experimentation, including risk management, compliance, IT, cybersecurity, and customer experience.

As another step forward is the appearance of the phenomenon better known as BigTechs<sup>38</sup> which is the result of a trend according to which boundaries between industries are becoming blurred (particularly within consumer-focused sectors such as retail banking and insurance) as consumers increasingly move toward digital and mobile, which ultimately results in lower operating costs. Global technology-based firms with widespread adoption across geographies often referred to as BigTechs, are leading the boundary-pushing charge. Thanks to huge investments in research and development, BigTech companies have a huge database of their customers, which helps them better understand and anticipate their behaviour, thus gaining the trust and loyalty of customers. On the other hand, these companies accumulate vast reserves of money for new ventures. Google, Apple, Facebook, and Amazon (GAFA) enjoy “first-in” status when it comes to consumers’ digital lives and record an exponential growth in the number of active users and the time spent with them.

## 5. CONCLUSION

A high degree of deregulation and the presence of major financial innovations are the hallmarks of modern banking. Numerous financial innovations have emerged in the modern financial market in recent decades, such as, for example, risk transfer products, exchange-traded funds, derivatives, different forms of tax-deductible equity, etc. Financial innovation results in changes in institutions, practices, markets, and financial instruments, recording their significant impact on risk management, financial markets, and the world economy. Despite numerous challenges related to taxes, regulation, information asymmetries, transaction costs, and moral hazard, one should be aware that without financial innovation, new financial products and processes will not appear on the market. Further development of financial innovation is not without its challenges, and the key is related to how customers adopt related innovations.

Technology and digitalization are rapidly transforming how the financial sector is operating. Innovative applications of digital technology for financial services, or FinTech, are being used to alter the interface between financial consumers and service providers and are helping to improve communication with consumers and increase their engagement. From the point of view of the modern phase of banking, the most significant driver of change is technological and financial innovation, which put traditional business models of banks to the test. Specifically, technological innovations in the financial sphere (better known as FinTech) are essentially contributing to changes in the structure of the entire financial system, using advanced technology and software solutions to provide efficient customer service. Strengthening financial innovation can contribute to strengthening the efficiency of the financial system and the banking sector, which would ultimately promote economic growth. On the other hand, the development of financial innovation carries with it a risk

38 Read more about this in: World FinTech Report Survey, Capgemini, LinkedIn, Efma, and MaRS, 2018.

to financial stability due to lack of transparency and regulation, which imposes the need for policymakers and central banks to closely monitor developments in the FinTech segment and then adjust financial regulation and policies. The FinTech industry is evolving so fast that regulators are struggling to keep up with progress. But control is inevitable, and we are likely to see larger institutions and regulatory bodies increase the emphasis on software and hardware regulation. In any case, the financial industry is a high-profile industry that requires the highest security. It is about the money from all of us, so security measures are necessary. The industry has a strong focus on technology, and technology is continuously changing. The only thing we can know for sure is that the FinTech market is prone to further shocks and that the rewards for those who set the mix of innovation and practicality on the right scale will be huge.

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