ARTIFICIAL INTELLIGENCE IN FINANCE AND FINTECH

CZU: 336:007.52 **https://doi.org/10.5281/zenodo.7540702**

Otilia MANTA, ORCID ID 0000-0002-9411-7925
Romanian Academy, Victor Slavescu" Centre for Financial and Monetary Research

Abstract: *Artificial intelligence has experienced a rapid evolution in recent years, and in the financial field solutions have developed with the same speed. Moreover, the trend of innovations in finance is an increasing one, and Fintech is gaining more and more ground instead of traditional financial services, an accelerated phenomenon and a result of digitization services globally. Obviously, in the world of research there are numerous hypotheses related to this phenomenon, which is why in our paper we propose to develop, based on empirical results, and scientifically argued answers to these challenges. Even more so, as artificial intelligence (AI) involves multiple potential risks, and these could be exemplified by opaque decisions, elements of discrimination, or even elements of a negative nature for the financial field. Identifying the opportunity and challenges of AI in the financial field is the core of this work, and the development and implementation of AI in the financial field should be based on a series of values and standards necessary for societal progress and balance.*

Keywords*: artificial intelligence. Finance, FinTech, sustainability, society*

Introduction

At the European and global level, the future of finance can be associated with digital technology, due on the one hand to the current European framework, but mainly to the fact that both consumers and companies increasingly access digital financial products and services, including through digital platforms that offer innovative digital financial services based on new technologies, which leads us to affirm that the models of innovation and business development are constantly changing and adapting to the current digital context. Digital finance is a support tool aimed directly at citizens and businesses, with a direct aim to face the unprecedented situation created by the pandemic, as well as the other crises in full swing. For example, online identity verification has allowed consumers to open accounts and use many financial services remotely. An increasing proportion of in-store payments are now digital and contactless, and online purchases (e-commerce) have grown significantly. FinTech solutions have helped expand and accelerate access to loans, including government-backed loans in response to the COVID-19 pandemic. Ensuring the safe and reliable operation of digital infrastructures has also become more important as the number of people using online financial services has increased and financial sector employees themselves work remotely. If there was any doubt, it is now clear that digital finance can bring many benefits, and Europe's citizens and businesses are ready to receive them. Europe, following the recovery strategy, can contribute to repairing the social and economic damage caused by the pandemic, as well as multiple crises, and digital technologies will be essential for the relaunch and modernization of the European economy in all sectors. These will enable Europe to advance as a global digital actor. At the same time, users of financial services must be protected against the risks arising from the increased use of digital finance, as also stated in the Commission's communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions "Now is the time Europe: repairing the damage caused by the crisis and preparing the future for the new generation", COM(2020) 456 final, 27.5. 2020. Research methodology The research methodology is based on empirical research, and as direct tools are those related to the collection of data and information from specialized literature and from existing practice in public and private institutions, but especially scientific articles published on specialized research networks (Researchgate, Academia .edu, etc.), articles published in various official journals of the European Commission, relevant specialized books in the field of reference, legislation, analyzes and studies and the interactive database of the National Bank of Romania, other relevant sources identified at the library of the Romanian Academy with related

institutes, the National Library, the National Institute of Statistics, etc. Furthermore, within the methodology, we will analyze the documents using the comparative, analytical, descriptive method, non-participative and participatory observation, calling on a set of informational sources, collecting financial data in established databases. Also, the work will be based on annual reports, publications, consolidated statistical data provided by the National Bank of Romania, the European Central Bank (ECB), the Bank for International Settlements (BIS), the European Commission, the OECD, published annually, data that will be processed to be able to provide an overall and analytical picture of the most important changes taking place in the European Union as a whole, but especially with regard to the budget for the 2021-2027 programming period, as well as the "green" financing mechanisms supported by European regulations and directives.

Research results

The synergistic approach of the total impact of technologies on financial activity is difficult to quantify, and the prospects are worrying, following the accelerated development of financial innovations and their related support instruments. The added value brought by FinTech in the financial sector derives mainly from the following three components: reducing costs, increasing the convenience of services and democratizing access to financial services. In terms of cost reduction, the savings to customers are enormous. In addition to time savings, FinTech offers great financial savings by offering a wide range of sustainable services at zero cost to customers (free of charge). For example, the American company Credit Karma [4] offers users free access to their credit rating and credit history, as well as keeps track of all the financial products used by the client. The major macroeconomic role of financial technologies emerges from their enormous contribution to increasing financial access, currently qualified as one of the major impediments to sustainable and inclusive development. As a result, we intuit (the author's opinion) that FinTech will be promoted by both governments and international institutions, and quickly assimilated by all users of sustainable financial-banking services. We can say that in the current conjuncture characterized by the sustainability of the FinTech industry, banks and traditional financial institutions are going to radically change their development strategies and fight to maintain their position on the market of financial products and services with increasing social and regulatory pressure to move towards ecological and sustainable practices. In the author's opinion, one of the ways to maintain their role in the financial industry is openness to the assimilation of innovations. However, a major problem raised by the development of the FinTech industry is the need to adjust the regulatory framework and financial supervision to the new realities. We find big lags here, as many aspects of technological innovations, which are already widely used, are not yet regulated and therefore cannot be supervised, and it is not excluded that they threaten the financial stability of national economies and, as a result of the world economy. In this context, adapting and synchronizing the legislative framework and banking supervision to the rhythms of the development of financial technologies must represent an imperative in the national and international political agenda. The digital transformation of the economy has changed the innovation process and business models, including in the field of financial services. Innovation is increasingly taking a digital form, facilitating the development of enterprises. Increasingly, innovation involves new products, processes or business models that are made possible by digital technologies. While in the beginning they performed only a simple support function, information technology systems, combined with the corresponding software, have become a central pillar of economic activities for many enterprises. This is because digitization offers substantial new opportunities, as digital networks and data services generally facilitate economies of scale, enabling the provision of better quality services at lower cost. In the existing open and innovative studies at European level on digital technologies and applications are increasingly built in a modular manner, communicating with each other through application programming interfaces, these aspects are also clearly described in the Reports to the Commission [], such as: Report containing recommendations to the Commission "Digital Finance: Emerging Risks in Crypto-assets - Regulatory and Supervisory Challenges in Financial Services, Institutions and Markets" []

expert recommendations on how in which an enabling framework can be created for the provision of technology-based financial services[], Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - "A strategy for SMEs for a sustainable and digital Europe" [], communication from the Commission to the European Parliament, the Council, the Committee European Economic and Social Committee and the Committee of the Regions on an EU strategy on retail payments, COM(2020) 592[].

At the level of the ***European digital financial strategy***, four priorities are defined for the digital transformation of the EU financial sector, respectively:

 The first priority is to address the fragmentation of the digital single market for financial services, to enable European consumers to access cross-border services and to help European financial firms expand their digital activities. Many businesses have confirmed that cross-border expansion is essential for them, as online services cost a lot to develop, but little to replicate, and often require large-scale deployment. A larger potential cross-border market facilitates the mobilization of the necessary funds for the development of such services. This gives consumers real access to cross-border services. Enterprises that reach the necessary scale can also offer such services at a lower price and better quality.

 The second priority is to ensure an EU regulatory framework that facilitates digital innovation in the interests of consumers and market efficiency. Innovations that use or rely on distributed ledger technology or artificial intelligence (AI) have the potential to improve financial services for consumers and businesses. The regulatory framework for financial services should ensure that these technologies are used responsibly, in line with EU values. More broadly, faster, more open and collaborative innovation cycles require regular review and adjustment of EU financial services legislation and supervisory practices to ensure that they support digital innovation and remain appropriate and relevant in ever-evolving market environments

 The third priority is to create a European financial data space which, based on the European data strategy, promotes data-driven innovation, including improving data access and data sharing in the financial sector. The EU has ensured that businesses, including financial firms, publish comprehensive financial and non-financial information about their operations and products. The EU has also paved the way for the exchange of payment account data as part of the revised Payment Services Directive. New measures to improve data sharing and intra- and cross-sector openness, in line with data protection and competition rules, will enable the financial sector to fully embrace data-driven innovation. This will encourage the creation of innovative products for consumers and businesses and support wider policy goals such as the creation of a single data market. It will also help facilitate access to the data needed to channel finance in support of sustainable investment.

 The fourth priority is to address the new challenges and risks related to digital transformation. Financial services are migrating to digital environments with fragmented ecosystems and interconnected digital service providers that are partially excluded from the scope of financial regulation and supervision. Therefore, digital finance can increase the difficulty of existing regulatory and supervisory frameworks to maintain financial stability, ensure consumer protection and protect market integrity, fair competition and security. To ensure the ability of digital finance to provide better financial products for consumers and businesses, these risks must be addressed. The Commission will therefore pay particular attention to the principle of "same activity, same risk, same rules", not least to ensure a level playing field between existing financial institutions and new market participants.

By 2024, the EU should put in place a strong legal framework enabling the use of interoperable digital identity solutions that enable new customers to quickly and easily access financial services ("onboarding"). That framework should be based on more harmonized anti-money laundering and countering the financing of terrorism rules and a revised framework on electronic identification and trust services for electronic transactions (e-IDAS Regulation). It

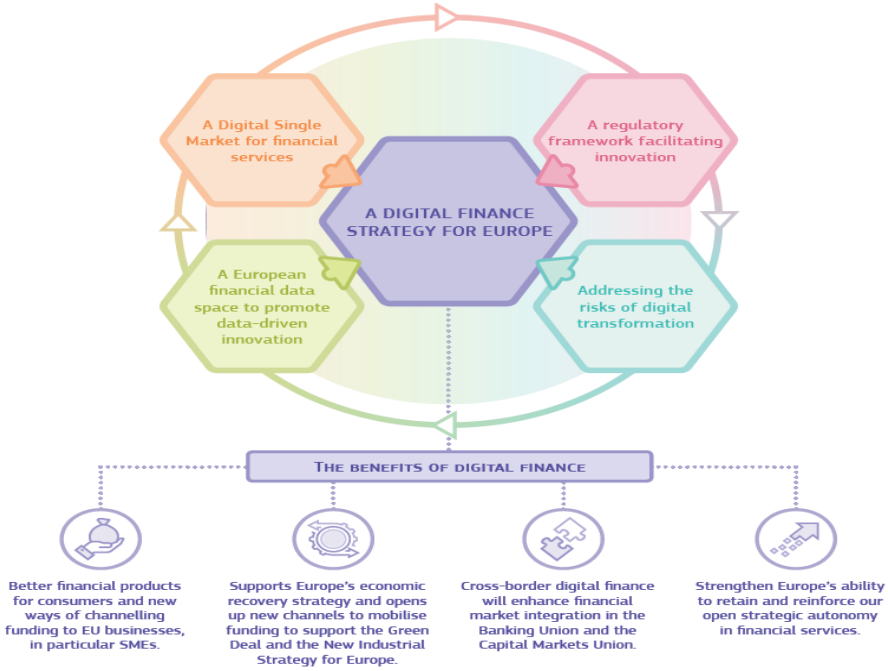
should allow the re-use of customer data, provided that the customer gives their informed consent, consent based on full transparency about the consequences and implications of that re-use.

Restrictions on the movement of people have highlighted the crucial importance of well-functioning digital financial services for consumers and businesses interacting remotely. In a cross-border context, in full compliance with anti-money laundering and anti-terrorist financing requirements and to facilitate compliance with other regulatory requirements for onboarding processes, for example to assess a customer's suitability for certain products investments. The Commission will facilitate – in three steps – the provision by financial service providers across the EU of secure remote onboarding processes. Moreover, at the European level, the European Banking Authority (EBA) will be involved in developing guidelines in close coordination with the other European supervisory authorities. The purpose of these guidelines is to ensure greater convergence in the identification and verification elements required for the purpose of the onboarding process, as well as how and to what extent financial service providers are entitled to rely on customer due diligence processes performed by third parties, including other financial service providers. Regulation (EU) no. 910/2014 on electronic identification and trust services for electronic transactions on the internal market and repealing Directive 1999/93/EC, OJ L 257, 28.8.2014, p. 73-114. Oversight of digital finances requires enhanced cooperation between various authorities. The EFIF will therefore bring together, for example, representatives from the European Data Protection Board (EDPB), the Commission's competition enforcement services and relevant national authorities outside the financial sector. They will attend EFIF meetings as observers to discuss the challenges posed by innovative business models that combine financial and non-financial services. Oversight of digital finances requires significant new skills. The Commission will continue to contribute to improving the technical skills of supervisory authorities, including through the EU FinTech Lab. The Commission is also ready to develop specific assistance programs together with the national authorities. This could be done, for example, through the Structural Reform Support Program https://ec.europa.eu/info/departments/structural-reform-support_ro. The Structural Reform Support Program (SRP) is an EU program that provides tailored support to all EU countries for their institutional, administrative, and growth-enhancing reforms. The EU FinTech Lab was established under the 2018 FinTech Action Plan and brings together service providers, financial institutions and supervisory authorities that look in detail at specific technologies or applications. Supporting technological innovation and its uptake in the financial industry Even though blockchain technologies are still at an early stage, there are a few challenges and risks to be addressed.

The EU Blockchain Observatory and Forum, which was launched in February 2018 for a 2-year period, aimed to monitor trends and developments, pool expertise to address sectoral and cross-sectoral issues, and explore common solutions and cross-border use cases of blockchain technology. The European Parliament also supported the launch of the European Financial Transparency Portal (EFTG) https://ec.europa.eu/budget/financial-transparency-system/index.html, a pilot project using distributed ledger technology to facilitate access to information on all companies listed on regulated EU stock markets in the context of the Transparency Directive. This initiative aims to increase transparency in EU regulated markets, promoting both market integration and market liquidity, in line with the objectives of the Capital Markets Union. The European Commission has also initiated, for example, blockchain for industrial transformations (#Blockchain4EU https://www.blockchain4europe.eu/) and proof-of-concept to use blockchain technology to facilitate excise duty collection. Given the cross-cutting nature of blockchain, which goes beyond financial services and potentially encompasses all sectors of the economy and society, the Commission has already taken steps to establish an EU blockchain initiative with the launch of the EU Blockchain Observatory and Forum. The initiative will propose actions, funding measures and a framework to enable modularity, develop governance and standards and support interoperability. This is a cross-sectoral initiative that is expected to enable the rapid adoption of this technology in the financial sector and increase Europe's competitiveness and technological leadership, in conjunction with other actions under this action plan (in particular,

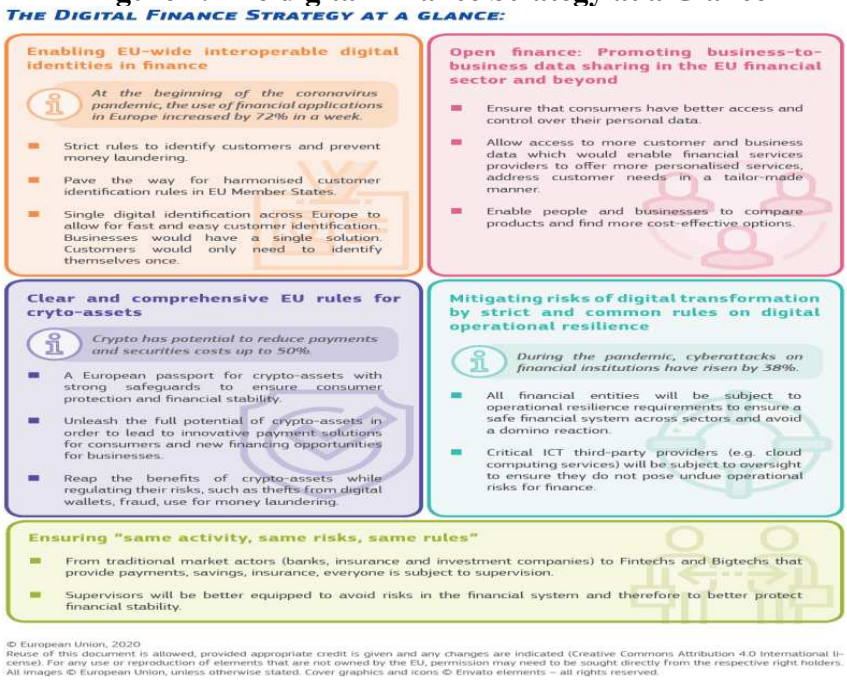
verifying the adequacy of EU financial legislation). This will also be based on pilot actions supported through the Horizon Europe program, which will be implemented in the period 2021-2027. The Commission also established links with the International Organization for Standardization's Technical Committee 307 on Blockchain and Distributed Ledger Technology. European standardization organizations have been invited to take a leading role in identifying EU-specific features regarding blockchain technology. Strong cyber resilience requires a comprehensive and collective approach, as well as effective training and awareness activities. To this end, the Commission recently adopted the Digital Education Action Plan, with a view to improving digital skills in the whole of Europe, including in cyber security. The inherently global nature of cyber threats has made it clear that to address such risks, international cooperation is essential: for this reason, the Commission is actively involved in the work of the G20 and G7 on cyber security in financial services.

Figure 1. A more competitive and innovative European financial sector, as well as ensuring the integrity of the EU financial system through the digital financial strategy applied at European level.



Source: https://ec.europa.eu/

Figure 2. The digital Finance Strategy at a Glance



Source: Fintech and financial disruption, 2017, Akinson H.,CSFI, Churchen R.,PwC

Figure 3. More competitive and innovative European financial sector, as well as ensuring the integrity of the EU financial system through the digital financial strategy applied at European level and the studies carried out at international level

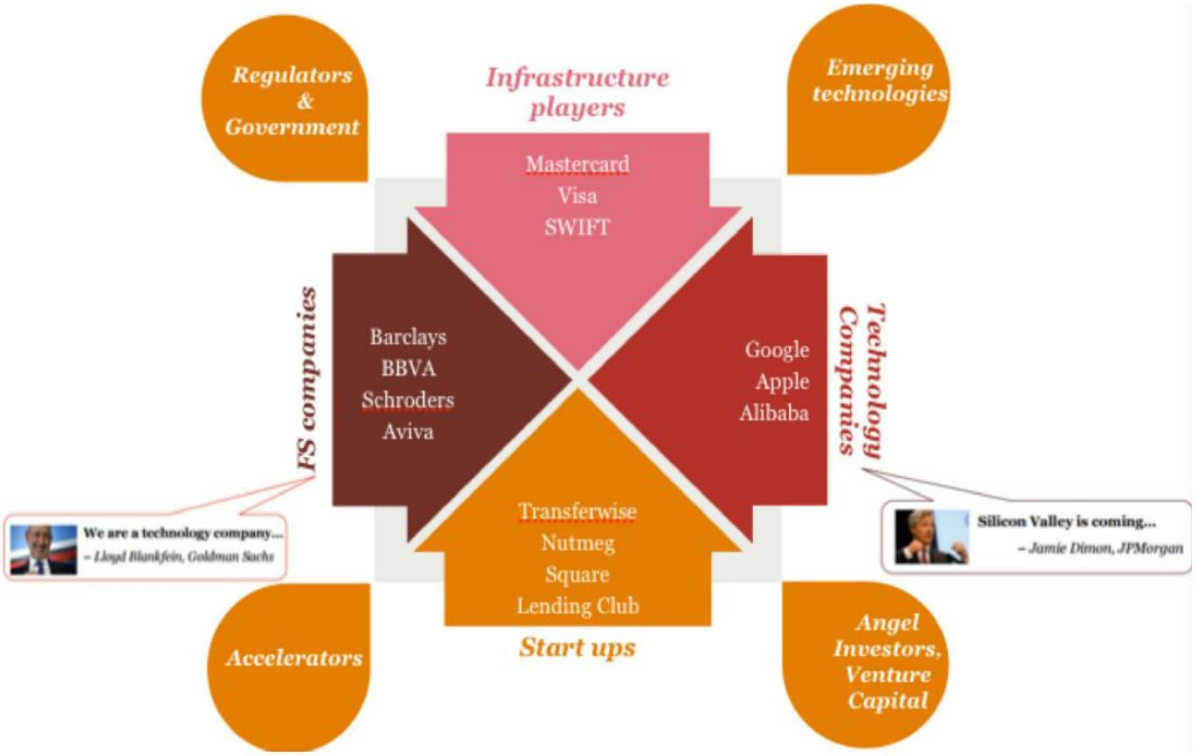
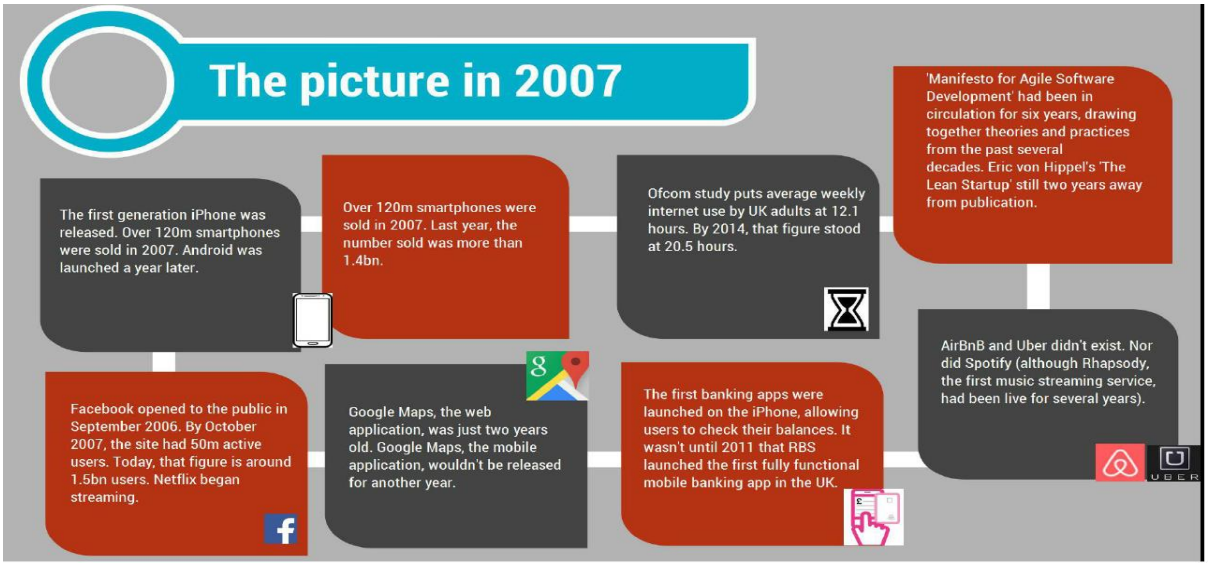


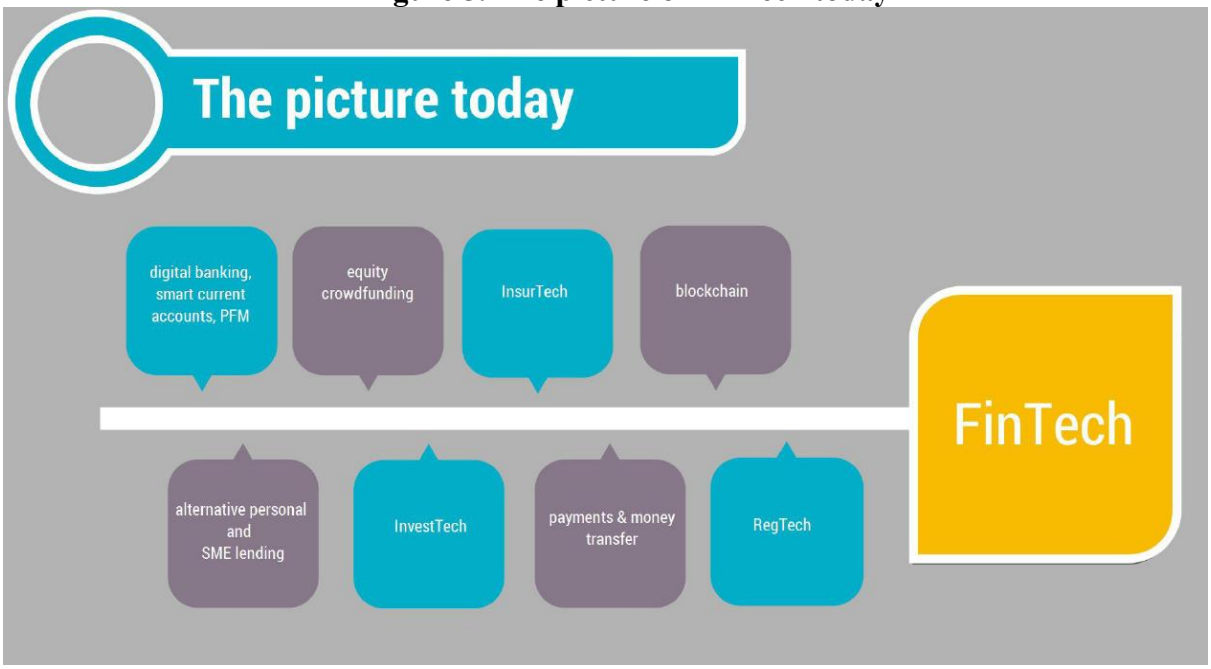
Figure 4. Image of FinTech in 2007



Source: Fintech and financial disruption, 2017, Akinson H.,CSFI, Churchen R.,PwC

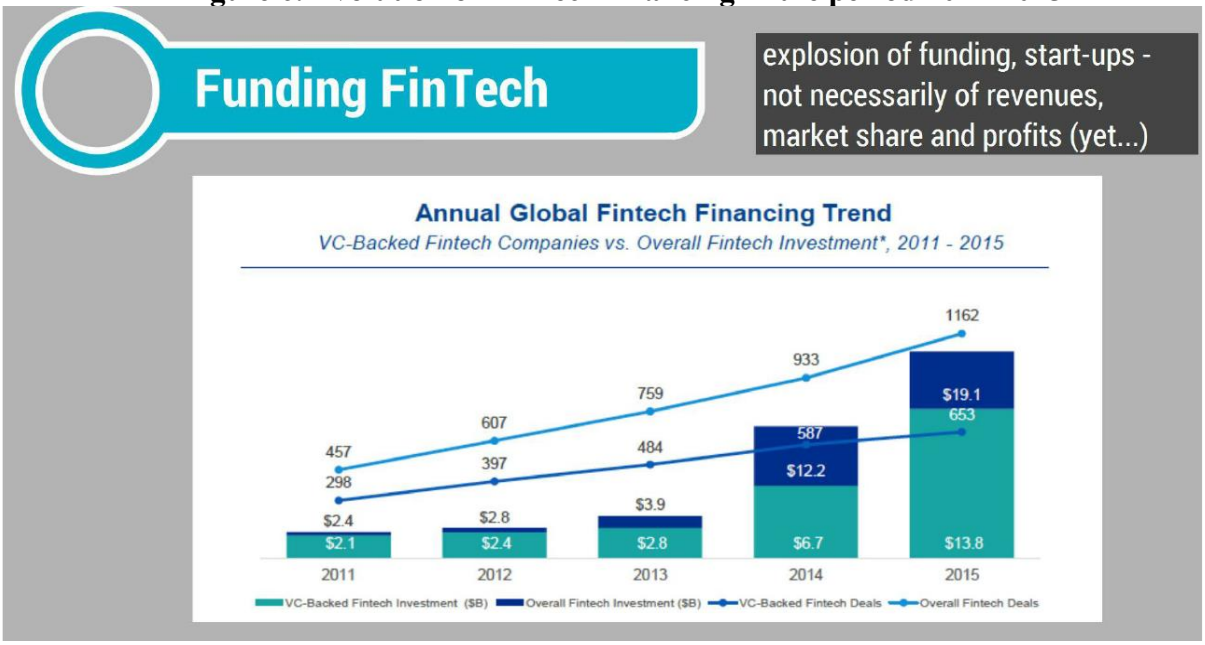
More competitive and innovative European financial sector, as well as ensuring the integrity of the EU financial system through the digital financial strategy applied at European level and the studies carried out at international level.

Figure 5. The picture of FinTech today



Source: Fintech and financial disruption, 2017, Akinson H.,CSFI, Churchen R.,PwC

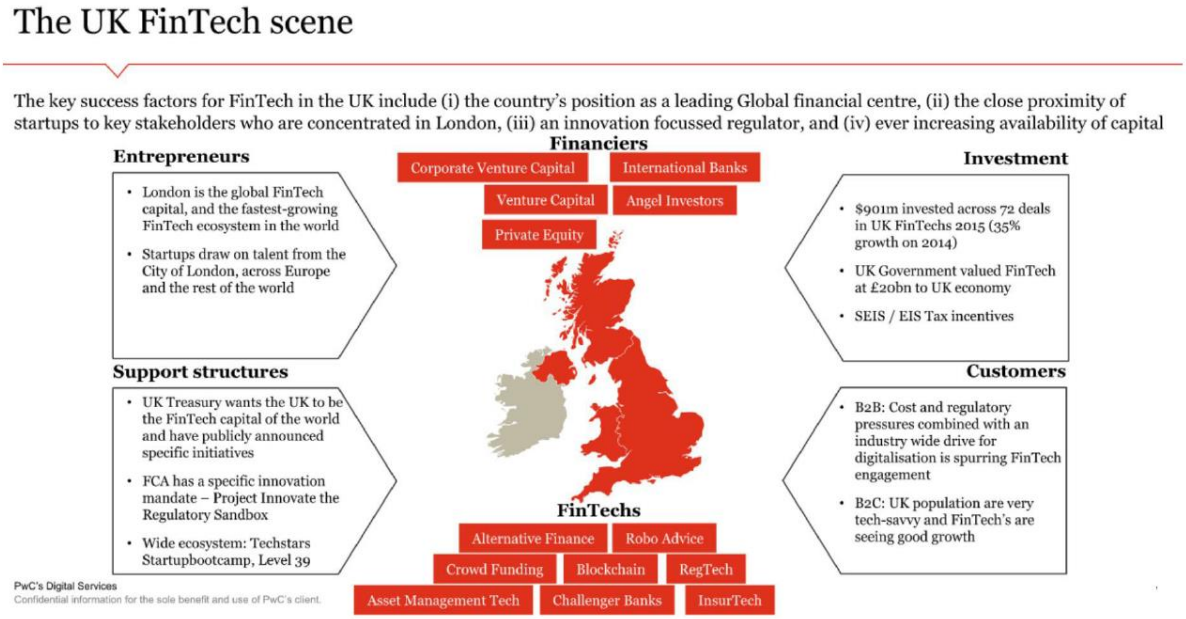
Figure 6. Evolution of FinTech financing in the period 2011-2015



Source: Fintech and financial disruption, 2017, Akinson H.,CSFI, Churchen R.,PwC

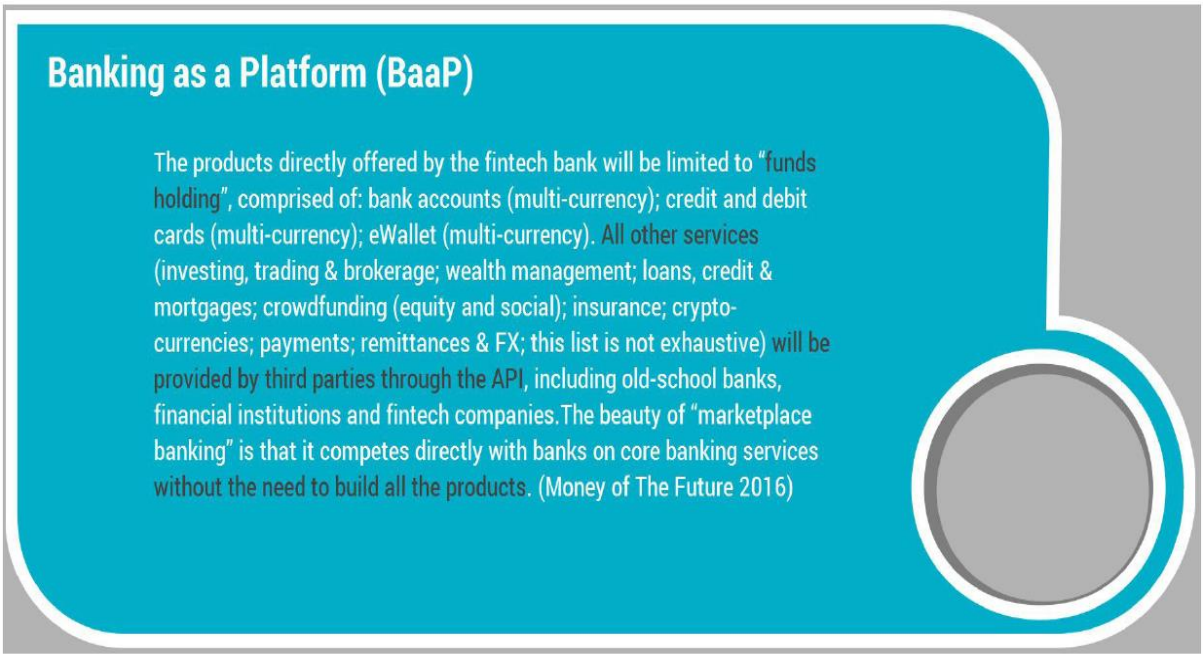
More competitive and innovative European financial sector, as well as ensuring the integrity of the EU financial system through the digital financial strategy applied at European level and the studies carried out at international level.

Figure 7. Factors influencing the FinTech industry



Source: Fintech and financial disruption, 2017, Akinson H.,CSFI, Churchen R.,PwC

Figure 8. Characteristics of financial platforms



Source: Fintech and financial disruption, 2017, Akinson H.,CSFI, Churchen R.,PwC

The September 15, 2022 Will McCurdy press release estimates that the total value of embedded finance "will reach $7 trillion" in 2026, and the fintech market will have the following characteristics:

 Growth areas such as B2B payments and business lending will push the sector to unprecedented heights, according to Bain & Company;

 The total value of embedded finance transactions will grow to $7 trillion in 2026 and account for 10% of all financial transactions in the US, according to Bain & Company research.

 "Embedded finance" describes an approach where the financial front-end and back-end become decoupled so that non-financial consumers such as retailers can offer loans, payments, insurance or bank accounts smoothly.

 In addition, the analyst house predicted that the revenue opportunities for the software platforms and infrastructure providers powering these embedded offerings will reach $51 billion in 2026.

 According to the research, business lending will be a key growth area for embedded finance and is expected to grow fivefold over the next five years, from just $200 million in 2021 to $1.3 billion by 2026.

 Consumer payments currently account for more than 60% of all embedded finance transactions, according to Bain, and are expected to reach $3.5 trillion by 2026.

 Bain argues that smaller retailers stand to gain the most from the rise of B2B embedded payments, as the technology will help these companies deal with challenges such as late or unpaid invoices.

 Bain also took a pessimistic view of the impact of embedded finance on established banks, saying it posed a "major challenge" to traditional financial institutions, threatening to separate banks from their customers and leave them with low growth and margin roles low "of". a regulated entity"

 However, there is still “significant opportunity” for these institutions to use embedded funding, according to the consultant.

 It's not just Bain and company betting big on the potential of embedded finance.

 Mmob, an embedded financial fintech founded in 2020, whose clients include PensionBee and iwoca, raised £5m in a seed round in March 2022.

 Modulr, which counts Revolut and financial resilience startup Wagestream as partners, secured a $108 million Series C funding round in the same month to expand the reach of its embedded finance platform.

 Jeff Tijssen, Bain & Company expert partner and leader of its global fintech practice, predicted that there will be "no shortage" of growth funding for the sector and that platforms will continue to experiment by trying an embedded approach to tax and payroll services in the following years.

 Blake Adams, senior vice president at Bain Capital, argued that embedded finance will allow end consumers to access financial services at lower costs compared to traditional financial institutions.

Furthermore, the *Fintech Innovation Challenge* invites entries focused on the low-income women's market according to Will McCurdy's September 14, 2022 release, respectively:

 The nonprofit aims to reward companies working on solutions to the global gender gap in financial services.

 The non-profit organization Women's World Banking is running a competition for solutions that aim to solve the global gender gap in financial services.

 More than 1 billion women still do not use or have access to the financial system, according to the World Bank Group's latest Global Findex report.

 In addition, IFC estimates that there is a $300 billion financing gap for formal, women-owned small businesses worldwide, and over 70% of women-owned small and medium-sized enterprises have inadequate or no access to financial services.

Figure 9. Evolution of blockchain technology in the period 2015-2021

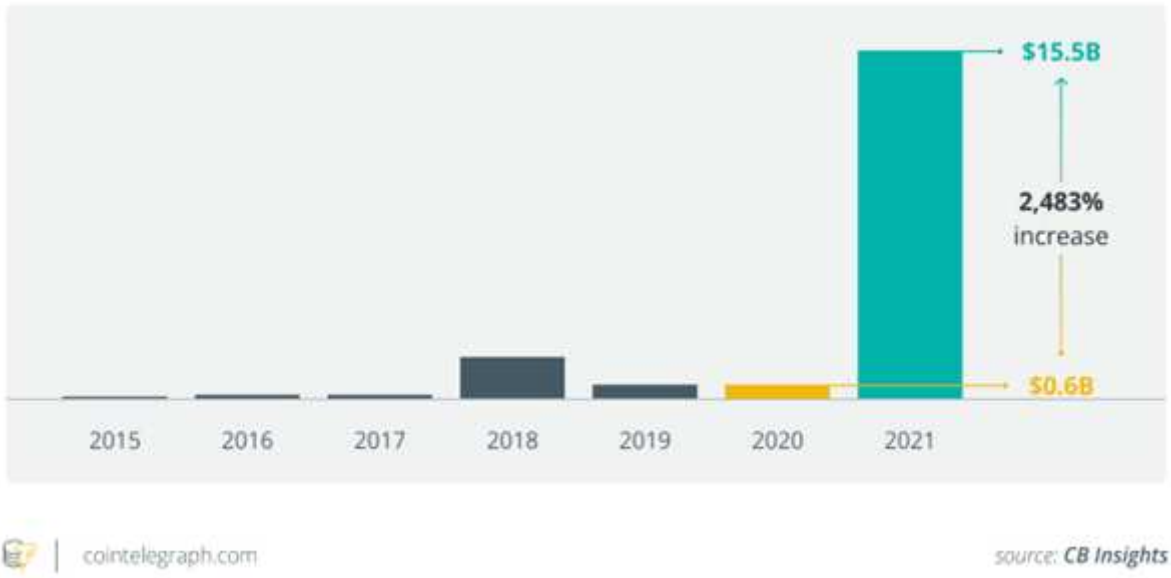
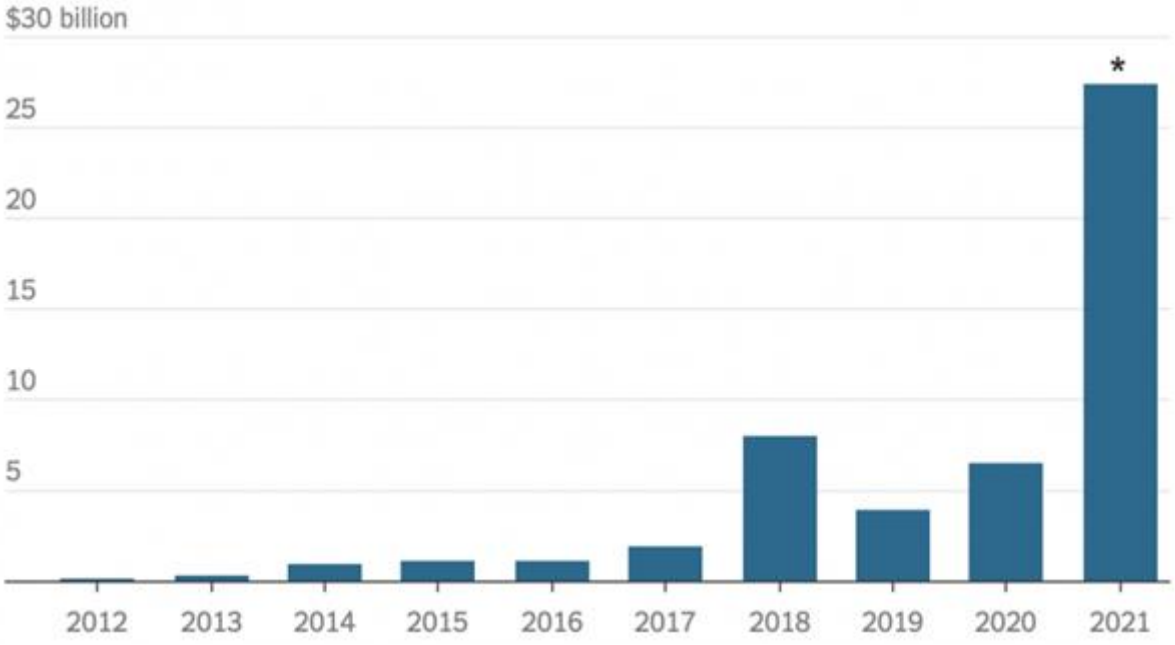
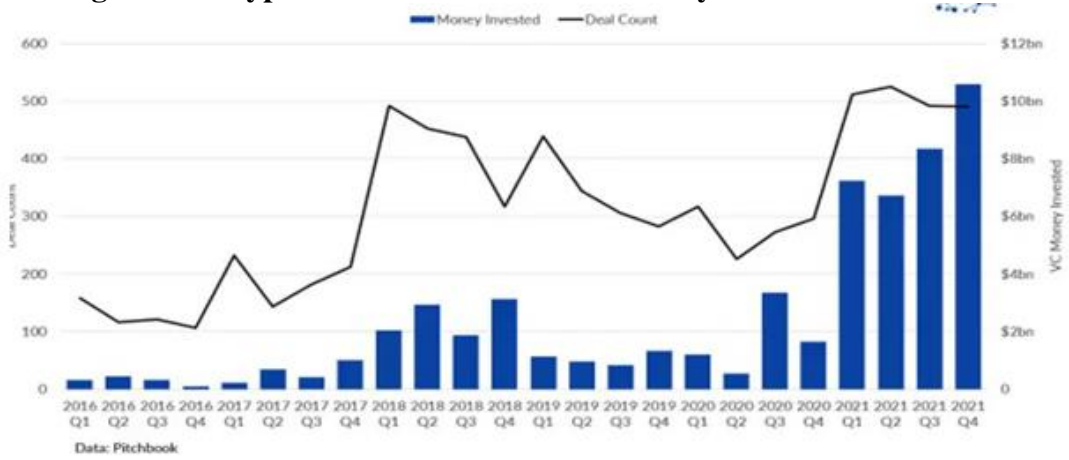


Figure 10. Global venture capital invest in cryptocurrency and blockchain companies



Source: Galaxy Digital Research,2022

Figure 11. Crypto/Blockchain VC deals: Money Invested&Deal Count



Source: Galaxy Digital Research, 2022

Fintech market trends are marked by purchases made in this market. For example, JPMorgan acquired a cloud payment technology firm to stay at the forefront of payments innovation, according to a statement on September 12, 2022. JPMorgan Chase (NYSE: JPM) agreed to acquire the payments innovation start-up of California, Renovite Technologies, Inc. (Renovite) as it aims to accelerate the delivery of its cloud payments offerings. So far, Renovite has had a presence in India and the UK, while providing services to JPMorgan since 2021. So far, the financial terms of the deal have not been disclosed. Max Neukirchen, global head of payments and commerce solutions, JPMorgan, publicized the acquisition. Payments Modernization - this strategic acquisition should help the US bank build its state-of-the-art merchant acquisition platform, assist the firm in its transition to the cloud, as well as drive its payments modernization strategy.

Banking giant Mizuho is issuing Japan's largest ever euro-denominated green bond of €800 million. Tokyo-based banking and financial services company Mizuho Financial Group announced on September 5th, the issuance of an €800 million (~$794.7 million) green bond that aims to finance green projects and help the bank achieve its sustainable financing goals. Notably, this new bond represents Japan's largest euro-denominated green bond to date. The maturity date of this bond is set for September 5, 2027, bearing an interest rate of 3.490%. In the press release,

the company outlined its environmental policy, which aims to limit the increase in global temperature to 1.5°C, aiming to reach net zero by 2050.

Conclusions

The rapid progress of FinTech is causing structural changes in the financial sector. In such a rapidly evolving environment, over-prescriptive and hasty regulation risks leading to undesirable outcomes. However, there is also the risk that avoiding updating policy and regulatory frameworks will put EU financial service providers at a disadvantage in an increasingly globalized market. There is also the possibility that, for example in the case of cyber security, the main risks remain unresolved.

The FinTech Innovations and Action Plan combines both supportive measures designed to contribute to the introduction of FinTech solutions and proactive measures to encourage and stimulate new solutions and decisively address emerging risks and challenges. The Commission set out its plans for further work to enable, create an enabling environment and, where possible, encourage innovation in the financial sector, while ensuring at all times that financial stability and a high level of investor and consumer protection are maintained. This is an important pillar of a more comprehensive strategic approach to regulation in the post-crisis environment. The objectives are linked to three aspects: capitalizing on rapid technological advances for the benefit of the EU economy, citizens and the sector, fostering a more competitive and innovative European financial sector, and ensuring the integrity of the EU financial system.

Regulating digital finance - it's been a year and a half since the Commission presented the digital finance package. Progress has been made, particularly with the legislative agenda in digital finance. But the next steps will be much more challenging. So, has it been achieved so far? First of all, the agreement of the member states and the European Parliament, regarding market infrastructures based on distributed ledger technology. Market players will have a safe space to experience the issuance, trading and settlement of stocks or bonds using blockchain technology. We count on them to use this opportunity. This will be essential to give EU capital markets a much-needed boost to development, but also to help supervisors and the Commission identify areas where rules might need to be adapted and enable long-term development in this area.

The new rules will provide legality, certainty to rapidly encourage responsible innovation in this growth of the asset class, while putting safeguards in place to protect investors against fraud, abuse and theft and preserve market stability. The member states reached a common position and negotiations at the European level. Thirdly, the adoption of new rules regarding digital operationality, as well as optimizing the resilience of financial firms. However, as the financial system continues to change, regulators need to look carefully at the European approach.

Trends in the FinTech market

A new generation of FinTech companies and international initiatives have succeeded in making payments faster, safer and available from a mobile phone. To stimulate innovation by unifying payment systems and at the same time market competition, government initiatives like PSD2 or payment standards like ISO 20022 enable the following:

- improving the quality of transaction information;
- sharing banking information with third parties;
- national and international bank transfers in real time;
- payments and mobile POS terminals;
- enhanced security through two-step authentication and biometrics

The "open banking" standard encourages competition and innovation based on service quality PwC, one of the major auditing and consulting firms, reports that almost 40% of bank clients are willing to share information related to transactions with other financial institutions.

The reason? That gives them an overview of all their accounts and they can receive personalized loan offers and other services.

What is "open banking"?

Open banking is a government-wide initiative that emerged in the United Kingdom in 2018. It was proposed by the Competition and Markets Authority with the aim of boosting innovation and competition.

In the EU, open banking has become part of PSD2 (Second Payment Services Directive), a directive designed to make payments safer, stimulate innovation and help banking services adapt to new technologies.

What are the differences between open banking and PSD2?

1.PSD2 is the EU-wide legal framework that requires financial institutions to share financial information with third parties, including other banks or fintech applications.

2.Open Banking is a UK-wide initiative that has established a standard format for information sharing, based on the API (Application Programming Interface)

This openness to third parties created new solutions to already existing problems.

How does open banking help innovation and competition?

Open banking gives customers and businesses greater control over their own finances and the information shared with third parties. It also supports the emergence of new applications and solutions that were not possible before that connect users' finances. They can:

 Use a single application to access information about balances and services from several banks with which they have accounts;

 Get updated information about bank branches and ATMs

 Use applications that account for all payments made from any account registered in the application. Thus, the user can see and manage all his expenses in one place;

 Better manage possible debts, with notifications about financial offers with lower interest rates.

Companies can:

 Get apps that give them unified access to multiple accounts from multiple banks;

 Use tools from the fintech offer to improve your cash flow;

 Access loan offers with lower interest rates as a result of sharing business history.

Since it almost doesn't matter which bank you have an account with, what would interest you the most?

 The likely answer is: a flawless user experience and low fees due to the competition in this market.

 New applications based on open banking appear almost every day.

 All try to innovate and combine multiple sources for information, tailored to your financial needs, and offer solutions and suggestions presented in a way that is easy to understand.

 Want to try out some Open Banking based apps and see what they can do?

Openbanking.org.uk – the entity that proposed the new standards manages an app store where you can already find about 100 applications. You can also find other popular apps on Google Play or the App store.

Mobile payments are starting to overtake card or cash payments. Payments with mobile wallets such as Samsung Pay, Google Pay, Apple Pay or the iCard wallet are starting to be used more and more. At iCard we have seen 45% growth in the last year for mobile payments at the POS. Here are some numbers to help you better understand these changes:

 Globally, mobile payments are forecast to grow from $1.15 billion in 2019 to $3.1 billion in 2024

 1 billion users made at least one mobile payment in 2020;

 More than 50% of Gen Z already use a digital wallet every month

 Cash payments fell from 30% in 2018 to just over 20% in 2020. It is forecast to drop to 17% in 2022.

 Card payments are growing, but it is negligible compared to that enjoyed by mobile payments

 In Europe, Sweden and Denmark are at the top of the list of countries that have adopted mobile payments (respectively 36% and 41% of smartphone users).

 The United Kingdom (19%), the Netherlands (20%), Italy (21%), Switzerland (22%) and Norway (25%) are in the middle of the ranking, followed by other countries where mobile payments are used by fewer users: Germany (12%), France, Spain and Finland (16%, 17%, 18%).

Biometric and/or two-step authentication protects your money and confirms payments
You probably already pay with your fingerprint, Face ID or retina scan.

 Another aspect that PSD2 focused on was the implementation of two-step authentication for payments.

 One of the 3 types of authentication is biometric.

 Modern devices can easily scan all kinds of identifiable features.

This is a trend that is widely implemented because it significantly improves safety. It's also one of the reasons why mobile payments are enjoying such rapid adoption. They are simply safer than card payments and much faster.

Why is biometric authentication so important?

This authentication method has major benefits:

 The protection is superior to that offered by the PIN code of the debit or credit card. It is possible that in the future biometric authentication will completely replace the use of PIN code or passwords - the latter are relatively easy to find out through one of the phishing methods that you must beware of.

 Transactions with biometric authentication have higher limits;

 Payment authorization is much simpler and faster;

 Personally identifiable information cannot be accessed by merchants, it is still kept encrypted on the mobile device;

 Phone authentication to make a payment is compatible with the already existing POS network. Biometric authentication payments are forecast to grow 10-fold by 2024, reaching a total of $2.5 trillion (up from $228 billion in 2019). Biometric debit cards have been tested in Europe. They have a built-in fingerprint reader – the fingerprint is memorized when the card is issued, so no one but the holder can use it.

Mobile POS means lower costs for merchants

The market for mobile POS (or mPOS) has been growing in recent years as they help merchants process payments faster, cheaper and with less queues. This growth has become even more accelerated in the last year, when due to the pandemic, more and more people prefer not to pay in cash.

What exactly is mPOS?

It's usually an app (or an app that comes with a device) for your phone that lets you use your phone instead of a POS terminal. Along with *digital finance, the strategy of open finance* was launched, which refers to the sharing, access and reuse of personal and non-personal data for the purpose of providing a wide range of financial services. The objective of open finance is to promote innovative financial products and services for the direct benefit of consumers and businesses. A key condition for open finance is strong consumer confidence and trust. Further steps towards increased data openness between and within sectors will increase opportunities for data-driven innovation and support the creation of a wider single market for data.

A central objective of open finance should be to improve financial products and services and create opportunities for consumers and firms to get better targeted advice and personalized services. This includes:

Customer experience – wider choice for customers and easier identification of the best options through access to a more personalized range of services and products; as well as an easier ability to access and use those products;

Financial inclusion - improving access and use of financial services for all segments of consumers and companies, including SMEs and the access of financially excluded people;
Customer control - giving customers significant control over how their data is shared and reused, in line with data protection rules; giving consumers and businesses greater transparency about how their data is used and accessed;

Innovation - facilitating data interoperability in open finance; as well as supporting the development of artificial intelligence/machine learning models to build services and products for consumers and firms, including more accurate prudential risk management.

Horizontal approach – incorporates the open financial approach of customer-centric services in an overall cross-sector framework.

The *Inclusive Fintech 50* identifies promising early-stage fintechs that are driving financial inclusion across the globe through a competitive process led by an independent panel of judges from venture capital, technology and financial services. Applicants are evaluated based on the degree to which their target market includes underserved individuals or companies, and whether their innovation provides a new value proposition, shows early-stage traction, and can have a visible impact on the more than 3 billion financially underserved people at the global. Inclusive Fintech 50 is sponsored by Visa, MetLife Foundation and Jersey Overseas Aid & Comic Relief, with support from Accion and IFC. The initiative is managed by the Center for Financial Inclusion (CFI)

Bibliographical references

European Digital Finance Strategy, https://ec.europa.eu/info/publications/digital-finance-outreach-2020_en

Report containing recommendations to the Commission - "Digital finance: emerging risks in crypto-assets - regulatory and supervisory challenges in financial services, institutions and markets" [2020/2034(INL)], https://oeil.secure.europarl.europa.eu/oeil/popups/ficheprocedure.do?reference=2020/2034(INL)&l=en Report of the Expert Group on Regulatory Obstacles to Financial Innovation, established by the European Commission in June 2018, it published its recommendations on how to create an enabling framework for the provision of technology-based financial services.

https://ec.europa.eu/info/publications/191113-report-expert-group-regulatory-obstacles-financial-innovation_en

https://ec.europa.eu/info/publications/cmu-high-level-forum_en

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - "A strategy for SMEs for a sustainable and digital Europe", COM(2020) 103, 10.3.2020

https://eur-lex.europa.eu/legal-content/RO/TXT/HTML/?uri=CELEX:52020DC0103&from=EN
Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on an EU strategy on retail payments, COM(2020) 592.

Regulation (EU) no. 910/2014 on electronic identification and trust services for electronic transactions on the internal market and repealing Directive 1999/93/EC, OJ L 257, 28.8.2014, p. 73-114.

Structural reform support program https://ec.europa.eu/info/departments/structural-reform-support_ro
European Financial Transparency Portal (EFTG) https://ec.europa.eu/budget/financial-transparency-system/index.html,

 # Blockchain4EU https://www.blockchain4europe.eu/

Horizon Europe Program https://ec.europa.eu/info/funding-tenders/find-funding/eu-funding-programmes/horizon-europe_en

Action plan for digital education https://education.ec.europa.eu/ro/focus-topics/digital-education/action-plan/action-10

https://finbold.com/jpmorgan-acquires-cloud-payment-tech-firm-to-stay-at-the-forefront-of-payment-innovation/

https://finbold.com/banking-giant-mizuho-issues-japans-largest-ever-eur-pegged-e800-million-green-bond/

The concept of open banking: www.openbanking.org.uk