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Fintech and banking: today and tomorrow

Speech by the Deputy Governor of the Bank of Italy

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1. Introduction

Technology and digital transformation are radically changing people's habits and firms' activities. They are changing the ways in which people produce, buy goods and services, and interact with each other.

Our daily activities increasingly depend on connectivity. In 2016, about 95 per cent of businesses in OECD countries had a broadband Internet connection and more than 75 per cent had a web presence. Half of the adult population had purchased goods or services online, compared to 36 per cent in 2010.

Innovation has had a remarkable effect on mobile devices. The smartphones in our pockets have a computing capacity far greater than that of a 1960's supercomputer, they are a hundred thousand times lighter and ten thousand times less expensive. Last year 1.5 billion smartphones were sold globally – that's one fifth of the world's population. Mobile technology and services are estimated to have contributed $3.6 trillion or 4.5 percent to global GDP in 2017.[1]

The new technologies are "virtualizing" our everyday tasks, from economic to interpersonal relationships, to the purchasing of goods and services. In the digital era financial, economic and even social inclusion depend on technological inclusion.

The effects of digital transformation have not fully emerged yet. It is still hard, at this stage, to foresee all the consequences of the application of artificial intelligence (AI), machine learning, and Big Data. This transformation is replacing intellectual activities, and might do to human thinking what the technological revolutions of the 18th and 19th centuries did to human physical labour.[2]

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1 IMF, *World Economic Outlook*, April 2018.

2 In the last three centuries, four phases of industrial revolution resulted in unprecedented economic and social progress. The first phase (between 1750 and 1830) was characterized by the invention of steam engines, cotton spinning machinery and the railways. The second was triggered by the invention, between 1879 and 1900, of electricity, the internal combustion engine and the provision of running water. The third phase encompassed the computer and the Internet revolution, beginning in the 1960s and peaking in the 1990s. The fourth industrial revolution is the current digital revolution (see R. Gordon (2012), "Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds", NBER, Working Paper No. 18315, August 2012.

The financial industry has always been an early adopter of new technology. The first Automatic Teller Machine (ATM) in history was installed in 1967 at a branch of Barclays Bank in London, to allow clients to get cash outside normal working hours. Since then, many automated services such as second generation ATMs, POS systems, debit and credit cards, online trading and online banking services[3] have been offered in response to customers' demand for immediacy. Thus, the widespread adoption of digital technology in financial markets in recent years should not come as a surprise.

The use of digital financial services is set to soar, boosted by rising customer expectation, the spread of Internet, smartphones and tablets, by the steady fall in data storage cost and by the improvement in the processing capacity of computer systems, including via cloud computing.[4] The progress recorded in the last few years is astonishing: for example, the amount of data exchanged internationally is now 45 times greater than in 2005, while the cost of storing information is 10 times lower than in 2010.[5] It is against this backdrop that fintech comes into the equation.

2. Fintech

What do we mean exactly by fintech? The Financial Stability Board defines it as "technologically enabled financial innovation that could result in new business models, applications, processes or products with an associated material effect on financial markets and institutions and the provision of financial services." According to this definition, fintech encompasses a wide range of services and activities.

An example may help clarify this. In addition to using banknotes, cheques, or Internet banking, today I can use my mobile phone to transfer money to a friend. All I have to do is to download the appropriate app, type a simple text message and select my friend's name from my contacts list. My friend would receive the money in a few seconds, and could even reuse it immediately for his own payments.

The evolution of financial advisory services provides another example. In the past, when I needed financial advice, I contacted my advisor. In most cases he would not remember my name or my financial situation (although in some cases he would pretend he did!). He would ask for my

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[3] ATMs are electronic instruments that make it possible to carry out current account operations (cash withdrawals or deposits) without needing a bank clerk to intervene. Point of Sale (POS) systems use electronic terminals that accept non-cash payment instruments, such as debit and credit cards.

[4] Cloud computing uses a remote server accessed via the Internet to provide IT software and hardware resources such as the storage, processing or transmission of data.

[5] See McKinsey (2016), 'Digital globalization: The new era of global flows'.

account number to check the composition of my portfolio and key information such as my age, income, risk aversion and investment objectives. He would then provide his advice, possibly after one or more face-to-face meetings. Today some fintech companies and banks can offer such advice much more quickly and efficiently through their 'robo-advice' services. I only need to provide my code number to a computer which, using artificial intelligence, will select the investment programme best suited to my profile and risk appetite.

Financial services are still predominantly distributed through traditional channels. Fintech only plays a significant role in certain segments of the financial sector, such as retail payments, asset management and small loans. But it is rapidly expanding into sectors such as lending-based crowdfunding and chatbox customer relations services. The use of technologies such as AI, Big Data and distributed ledgers (DLT)[6] is also on the rise.

Competition from fintech companies is starting to erode the margins of traditional banking. It is estimated that over the next ten years, as fintech firms expand into all market segments, they could erode 60 per cent of the profits that banks generate from retail services.[7]

The success of some fintech companies – think for example of the multinational TransferWise[8] – is driving many banks to deepen their commitment to the new technologies. Numerous large banks are expanding their range of digital services by increasing their investment in them and by entering into agreements with fintech companies. In some cases, integration is achieved when a bank acquires a fintech firm.[9]

In the countries where online retail trade is most developed, the leading fintech players include tech giants such as Apple, Google, Amazon and Facebook in the United States, and Alibaba and Tencent in China. For example, Apple and Google have developed solutions that allow payment instruments to be used in cooperation with banks. Amazon grants loans to small businesses for a total amount that has now exceeded $3 billion. Facebook allows users in the U.S. to make payments to others in their contacts list and is beginning to lend to small businesses. Alibaba makes payment services available through its affiliate company Ant Financial. Tencent offers a broad range of financial services through its social media app, WeChat.

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6 DLT is the technology underlying virtual asset transactions. It is based on a decentralized system with the direct exchange of messages between nodes in a network and the recording of transactions in a synchronized ledger distributed across the nodes (see Bank for International Settlements, *Distributed ledger technology in payment, clearing and settlement - An analytical framework*, February 2017; https://www.bis.org/cpmi/publ/d157.pdf).

7 See McKinsey (2017) *Retail Banking Insights*, April.

8 TransferWise, founded in 2011, is an e-money institution that makes it possible to transfer money to and from Europe, Asia, the Americas, Oceania and Africa.

9 An example is J.P. Morgan's recent acquisition of the start-up WePay.

These developments have been facilitated by the complementarity between online platforms, the demand for services by consumers and firms on the platform, and the use of digital payment instruments. Indeed, platforms can be a single point of contact where firms, households and providers of financial services can interact more efficiently, and could become the most effective and widely used means of providing financial services in the future.

3. The outlook for banks in the fintech era

The digital revolution raises a number of questions as regards the outlook for the banking sector. A crucial issue is what the future relationship between banks and fintechs will be, and what this will imply for the supply of banking services and for banks' profitability and market power.

The answer to these questions depends on the kind of fintechs we are thinking of. As I mentioned before, the new actors are not just small fintech start-ups, but also the global Big-Techs such as Google, Apple, Facebook, Amazon, Alibaba. The challenges for banks arising from these two groups of competitors are fundamentally different.

While fintech start-ups are gaining market shares in specific business lines thanks to aggressive pricing policies, many banks have either established strategic partnerships with them or have taken them over. This way, banks are integrating fintech services into their value chains in order to support their digital plans.

The Big-Tech companies represent a much bigger threat for banks, due to their competitive advantages. First, by using their platforms – Amazon is an example – they have access to unique real time information on the products, sales, and customer satisfaction levels of firms using their platform; they can observe revenues and market structure, estimating the firms' profit-generating capability. They also hold information that they can use to infer consumers' preferences and living standards. Such information can be exploited to screen firms and customers and assess their credit risk – a function that is at the core of traditional banking. Second, the Big-Techs have a very large customer base, and thanks to their customer-centric business models, they can exploit customer-specific information much more efficiently than banks, that are typically focused on products (deposits, mortgages, etc.). Third, large technological firms are more skilled in managing large volumes of data – especially unstructured data – than banks. Fourth, the Big-Techs have enormous financial strength, and this is apparent in the ample liquidity they have accumulated in the course of their activities and record market capitalizations – not far off $1 trillion in some cases. They can use these resources to expand their financial intermediation business.

What will be the impact of the interaction between banks and the new players? On the one hand, digital transformation and recourse to technologies such as AI and Big Data allow banks to cut costs and to improve the quality of the services provided. On the other hand, technology breaks down the traditional barriers to entry in the credit and financial services markets, fostering competition: already today fintech firms are offering technology-intensive low-cost services.

It is therefore hard to predict what will be the ultimate effect on the supply structure of financial services and banks' profitability. I believe, however, that there are already two clear implications. First, banks will have to invest heavily in technology to compete with one another and with new entrants: this is necessary for their very survival. Second, the structure of the financial systems will change radically in the next ten years with the entry of new non-bank operators.

Banks need to use technology more efficiently than in the past, when it was used to duplicate traditional activities. They must use remote digital services to replace, rather than flank, the traditional distribution channels, although bank branches will not disappear entirely, because I can't see many customers getting a mortgage online.

Overall, I do not expect independent fintech firms to be able to replace banks. The value chain of banks includes bundled services like deposits, payments, and lending. Fintechs generally carry out one or more of these activities in an unbundled way. Yet, bundling provides powerful economies of scope. If fintechs wish to expand their businesses to exploit such economies of scope, then they will probably have to transform themselves into banks.

4. Role of the authorities: cyber risk and regulation

As with all opportunities for progress, the technological revolution raises new issues and may expose customers to little known risks. Two issues deserve close scrutiny by the public authorities: cyber risk and regulation. In this section I will briefly address them in turn.

4.1 Cyber risk

Cyber risk can cause enormous damages. In 2017, the spread of two pieces of malicious software called WannaCry and NotPetya led to losses in the hundreds of millions of dollars for their high-profile victims, which include the British National Health Service and shipping giant Moller-Maersk of Denmark. Attacks through the interbank messaging service SWIFT resulted in large-scale theft from customers, including central banks, between 2016 and 2017. Illegal access to confidential emails was a key issue in the U.S. presidential campaign of 2016.

The consequences of these events, while serious, are still benign compared with what would happen in the event of a truly systemic cyber crisis: the British insurer Lloyd's and the American Big Data firm Cyence have estimated that a massive disruption to cloud computing services could cost the global economy more than $50bn.[10]

The financial sector is highly exposed to cyber attacks because it makes intensive use of ICT, and because it is highly interconnected at the global level. It is attractive not only to digital thieves but also to politically motivated actors who want to disrupt the functioning of our economies. For these reasons, it was one of the first civilian sectors to enforce strict cybersecurity standards, and perhaps the only one that has achieved significant results in broad-based international cooperation.[11]

Central banks and other financial authorities are working to supplement the traditional regulatory and supervisory approaches with the development of public-private cooperation and the adoption of new tools to address cyber risks. A milestone of such an approach was the publication in 2016 by the G7 countries of a set of non-binding principles, addressed to both markets and authorities, to strengthen the security of the financial sector at the international level.[12] Cybersecurity was recognized as a strategic priority, to be tackled at the highest policy level.

Various initiatives have been launched at both European and national level. In 2016 the Eurosystem launched the Cyber Resilience Strategy for Financial Market Infrastructure. Consistently with G7 principles, the CPMI-IOSCO guidance and recent European legislation,[13] the ECB and the national central banks will focus on three key areas: first, strengthening the cyber resilience of individual financial market infrastructures, including payment systems; second, increasing the cyber resilience of the entire financial sector; and third, promoting public-private cooperation on cybersecurity for the financial sector at the European level.

In Italy, to ensure a comprehensive strategic vision and the alignment of internal and institutional policies, a high-level task force on cybersecurity has been set up within Banca d'Italia. In this regard, the Banca d'Italia's three-year strategic plan envisages two specific lines of action. One focuses on protecting the Bank's critical assets by reorganizing security functions within the IT Directorate General. The other focuses on enhancing the cyber resilience of Italy's financial sector.

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[10] Lloyd's (2017), "Counting the cost: Cyber exposure decoded".

[11] The CPMI-IOSCO guidance on cyber resilience for financial market infrastructures is a key example.

[12] See "Fundamental Elements of Cybersecurity for the Financial Sector", followed in 2017 by the "Fundamental Elements for Effective Assessment of Cybersecurity for the Financial Sector".

[13] Directive (EU) 2016/1148 on the Security of Network and Information Services (the so-called "NIS Directive").

On the subject of public-private cooperation, the Banca d'Italia and the Italian Banking Association have created the Financial Sector Computer Emergency Response Team (CERTFin), which coordinates the sharing of information and cyber threat intelligence among banks, financial market infrastructures, insurance companies, markets and trading venues and outsourcers. Since its foundation, in January 2017, CERTFin has analysed and circulated information about 1,000 cyber events; and it has sent more than 200 warnings to individual financial firms about potential attacks, while continuously monitoring vulnerable areas.

Lastly, it is important to stress that actions taken by financial-sector authorities must be integrated with national cyber security strategies and frameworks. In Italy, this link is ensured via constant dialogue with appropriate government institutions, including but not limited to national intelligence and law enforcement agencies.

4.2 Basic principles of regulation

The regulation of fintech activity is still in its infancy, and the regulatory framework differs from country to country. A review of the choices made in each jurisdiction would require an in-depth analysis, and is well beyond the scope of my comments today. Here I will limit myself to examining the basic principles that in my view should inspire regulation in a sector characterized by the presence of many different kinds of providers – banks, fintech start-ups and the Big-Techs – and the fast pace of innovation.

In this context, the main challenge for the authorities is to strike the right balance between the overriding objectives of promoting innovation and competition on the one hand, and those of preserving the integrity of the financial markets and guaranteeing consumer protection on the other. Regulation should be designed in order to achieve such objectives.

First, it should guarantee a level playing field, in order to avoid regulatory arbitrage and distortions. Regulation should remain tech-neutral, treating the intermediaries that deliver the same services in the same way, focusing on the products offered and not on the technology or business model used to provide them.

Second, given the rapid change that will affect the fintech sector in the future as well, regulation and supervision should be flexible, in order to encourage innovative projects and to avoid any obstacles to the changes that are also likely to affect the supply of technology-intensive services in the future. The strategies adopted to guarantee an "agile" regulatory environment for fintech start-ups differ across countries. In some countries (such as the United Kingdom) innovative start-ups can benefit for a limited time period from regulatory waivers while they test

the provision of their services (this is the "*sandbox"* approach). In other countries, such as Singapore, the authorities may cooperate with fintech firms to develop specific services – possibly through partnerships – in what are commonly called "*incubators*". Lastly, in other countries – including Italy – the strategies are based on "*innovation hubs*", where the authorities start interacting with the market players (banks, financial companies, innovative start-ups) on fintech-related issues at an early stage, indeed often at the planning stage, in order to provide them with the necessary support for the regulatory and compliance issues. The Banca d'Italia launched in November last year its *innovation hub* (Canale Fintech), a dedicated space on its web site where operators propose financial projects with innovative features; the aim is to open up a channel of dialogue with operators and to support innovation processes.[14] Each approach has its pros and cons that must be carefully weighed up.[15]

Third, a true level playing field would require financial sector authorities within each country – such as bank and insurance supervisors, market authorities, etc. – to cooperate with one another and with regulators in other fields such as data protection, cyber risk, and antitrust. In Italy the Ministry of Finance has recently established a committee for the coordination of fintech-related activities which includes the Banca d'Italia and other national (financial and non-financial) competent authorities.

More broadly, given the increasingly international nature of technology and the market for financial services, regulation should have an international dimension: it would be unwise to introduce national rules which could create regulatory barriers across jurisdictions, hampering or even impeding cross-border competition.

5. Conclusions

In conclusion, technological innovation is an exceptional tool for making progress. The adoption of digital technologies and a more intensive use of the enormous volume of data available today will enable banks and other intermediaries to reduce their costs and improve the quality of their services. There are huge potential advantages for consumers, firms and for the whole economy.

Technology is breaking down the barriers to entry in the credit and financial services markets, and a less efficient player may not be able to survive the ensuing increase in competition.

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[14] https://www.bancaditalia.it/compiti/sispaga-mercati/fintech/index.html?com.dotmarketing.htmlpage.language=1

[15] For example, regulatory sandboxes face the challenge of striking the right balance between two objectives: encouraging innovation and protecting consumers.

I expect the structure of banking and financial markets ten years from now to be very different from what it is now; non-bank operators will probably play a much bigger role.

But the spread of these new technologies and the availability of ever more comprehensive information on individuals raises broader and more fundamental questions that I have not addressed in my talk today.

Technology is creating the "technological unemployment" that had been foreseen by Keynes already in 1930[16] and is one of the factors further exacerbating income and wealth inequality in both advanced countries and emerging market economies. It also raises the issue of how to guarantee confidentiality in relation to Big Data, how to use it within the limits imposed both by the rules and by the will of our citizens, whose right to privacy must in any case be upheld. We must better define both the legal and ethical limits on the use of Big Data. Recent events in connection with Cambridge Analytica and Facebook have sounded the alarm.

We need to think carefully, as of now, about how to make these developments fully compatible with the rights of individuals and about how to square the increasing availability of information on the private lives of each one of us in relation to our political views, state of health, or sexual orientation, with the protection of our personal freedom and with the rules that govern the functioning of a modern liberal democracy.

[16] J. M. Keynes (1930) "Economic Possibilities for our Grandchildren", freely available online.

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