



BANKING ON CHANGE

New technologies promise to reshape the financial services industry

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The first automobiles were essentially old-fashioned carriages with engines strapped on; it took years for pioneers like Henry Ford to design a vehicle specifically adapted to the new internal combustion engine. Looking back, those early machines seemed to awkwardly straddle two eras. But such hybrids are typical of periods of rapid technological change, when it's not entirely clear what products or services will emerge.

Today, financial services are in this transitional phase. On the one hand, paying credit card or utility bills online is quick, easy, and cost-free.

(Although in some countries, online banking means emailing pictures of paper checks!) On the other hand, cross-border transactions remain costly, time-consuming, and cumbersome. But pioneers wielding new technologies adapted to the financial sector—fintech, for short—promise to propel the financial industry firmly into the digital era, just as similar trailblazers revolutionized communications, media, and photography.

Consumers—whether people shopping for home loans and insurance policies or companies paying for foreign inputs to production—benefit from

faster, cheaper, and more reliable services. New firms enter the financial services industry, while incumbents face competitive pressure that forces them to embrace the new technologies or go the way of the horse and buggy. Policymakers must adapt existing regulations, or design new ones, as they seek to bolster financial stability and prevent fraud, money laundering, and terrorism financing.

The challenge for policymakers is to harness the benefits of fintech and minimize the risks without stifling innovation, which calls for international cooperation. Other questions worth considering, but not tackled here, include the impact of fintech on access to financial services in poor and remote locations, as well as its effect on the transmission of monetary policy.

Fintech embraces a broad array of innovations, including artificial intelligence, biometrics, encryption, cloud computing, and distributed ledger technology, or blockchains—which power virtual currencies such as bitcoin. Technology, of course, has already had a big impact on financial services; the first ATMs were installed in the late 1960s, and online banking has become widespread where high-speed Internet connections are available.

But today, the pace of change seems to be accelerating. One reason is that technologies themselves have recently benefited from significant breakthroughs. For instance, 90 percent of the data available today was generated in the past two years, reports IBM. In May 2017, an artificial intelligence program defeated a Chinese grand master at the ancient board game Go, surprising the many observers who thought that day of reckoning was decades away.

Perhaps more important, fintech innovations are complementary; progress in one enhances the effectiveness of another and opens the door to further applications. For instance, artificial intelligence combined with the explosion of available data could automate credit scoring and allow consumer and business borrowers to pay interest rates more representative of the likelihood a loan will be repaid on time. So-called smart contracts, benefiting from encryption technology and artificial intelligence, could automate sale of investors' assets according to predefined market conditions, which would enhance market efficiency.

Investors are betting the new technologies will pay off. Total global investment in fintech companies soared from \$9 billion in 2010 to more than \$25 billion in 2016, according to a report by the accounting firm KPMG. Market valuations of public fintech firms have quadrupled in the decade since the global financial crisis, outperforming other financial sector firms. Meanwhile, the public has taken a keen interest, judging by the frequency of online searches for fintech keywords.

To see how new technology could transform the industry, consider why financial firms exist in the first place. Most—such as banks, providers of interbank messaging services, and correspondent banks clearing and settling transactions across borders—are intermediaries. They stand between counterparties such as borrowers and depositors to facilitate transactions. They provide information on the counterparties, monitor them, and help spread out the fixed costs of engaging in transactions,

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including the costs of information technology and regulatory compliance.

New technologies could reduce the need for intermediaries. For instance, registries of standardized customer information available to regulators, along with customers' digital identities, could lower the cost of customer due diligence. And new technologies could offer more information on counterparties, as in the earlier example of more tailored and precise credit scoring, for instance. In both cases, intermediaries would become less relevant.

Those that remain—and many will—are likely to change the way they are organized. Much will depend on who owns and has access to customer data. Currently, large financial institutions invest heavily to obtain information on customers—such as their creditworthiness and transaction histories. That information makes it easier to offer customers tailored services, from payments to credit and investment advice. This encourages the





one-stop-shop model of banking offering a variety of financial services.

However, the amount of new data, and who owns it, could change that model. End users—whether individuals or firms—could own the data they generate in their transactions and business endeavors. In this scenario, customers would be much freer to switch between financial service providers and to use services of multiple providers. Another possibility is for new players to enter the financial sector. Social media, large online retailers, online entertainment companies, and Internet service providers increasingly control data about our habits and preferences, and to some extent about our wealth and transaction history. Will they partner with existing financial service providers or venture into this space themselves? It is hard to predict, but access to, and ownership of, data will give them significant leverage.

Barriers to entry will also evolve. The lower cost of offering financial services—as a result of automated back-office tasks, including invoice reconciliation—is likely to encourage entry.

But aspects of the financial sector will continue to favor a small number of large firms, though not necessarily those operating now. Trust will be vital; without it customers will never turn over their wealth, transaction requests, and personal data. Customers must still trust the security and stability of services, even if providers lose out to networks, markets, and algorithms. Building trust, though, requires money—often lots of it. Investment in brand recognition, information technology security and stability, and regulatory compliance can be substantial and could dissuade potential players.

Network effects will also remain prominent. In finance, as in other sectors, the ability to connect with other members of a network is especially valuable. A credit card, for instance, is more attractive if the payment network is extensive. But new entrants will have a hard time attracting customers if they are excluded from existing networks. Regulation can help by mandating some degree of interoperability between networks, as is the case among cellular network providers.

Fintech will also pose numerous issues for regulators whose job it is to buttress financial stability, protect consumers, and prevent monopolies.

Take algorithms, or machine learning. Relying on them to trade financial assets could expose investors to the risk that all buyers and sellers will engage in similar behavior, thereby amplifying price movements. They could also fail or be compromised in a cyberattack. Any of these events could undermine financial stability. Will regulators have to be software engineers who can check the computer code that underlies the algorithms?

Protecting customer data

Protecting customer data is another challenge. New technologies such as biometrics should theoretically make personal data safer by replacing easily compromised passwords with unique human characteristics, such as fingerprints or retina scans. But this approach presents new risks: a compromised retina scan cannot be changed the way a compromised password can. This is one reason Citigroup recently dropped plans for biometric verification of customer identity at ATMs, according to the *Wall Street Journal*. Nevertheless, new security approaches continue to be explored.

The availability of vast amounts of data also calls for the right balance between privacy and transparency. New rules may be needed to protect consumer privacy from cyberattacks. Regulators must also be on guard against money laundering and terrorism financing—particularly when it comes to virtual currencies, which can be designed to hide the identity of transacting parties. There are questions about which data can be used to tailor financial services—and how. Can financial institutions make those who live in poorer neighborhoods, purchase alcohol, or listen to the

“wrong” music pay higher mortgage rates? Would this not amplify rather than dampen, inequality?

The entry of companies such as Apple into the fintech market has blurred the traditional definition of a financial services provider. Regulators may need to respond by focusing on activities rather than well-defined entities such as banks and brokerage firms. But regulating activities is not straightforward if the related entities are quickly evolving. On whose door must regulators knock to inspect business practices? Will they just have to wait for users to lodge complaints to learn of new relevant institutions? Will new technologies be invented to help automatically assess online activities and service offerings?

Finally, even a well-designed domestic regulatory regime must have international cooperation to remain effective. Technology knows no borders; many services can easily migrate to less regulated jurisdictions. Greater harmonization between national regulatory frameworks would help level the playing field and facilitate the adoption of new technologies on a global scale.

A recent IMF study, “Fintech and Financial Services: Initial Considerations,” takes a close look at cross-border payments. This is an area that appears ripe for disruption, given the trouble and expense of sending money across borders. These shortcomings reflect the limitations of existing technology, to some extent. Without an international central bank, most payments are cleared and settled by private correspondent banks, which incur costs but also benefit from significant market power. Some fintech companies are nevertheless making inroads; one, for example, has been given a pan-European banking license that enables it to process cross-border payments directly for its business customers, bypassing banks, according to Reuters.

Electronic tokens could have the biggest impact on market structure and regulation. These tokens, which replace sensitive personal data with a unique string of numbers, could eliminate the need for the cumbersome system of bookkeeping banks use to complete electronic transactions—which requires costly identity verification, accounts, liquidity and risk management, and clearing and settlement services.

For now, cash is the only alternative to this costly system, but its simplicity is offset by the danger of loss or theft. That could change with

the introduction of the electronic token, which can easily and safely be transmitted across any distance. Tokens can be issued by private institutions or potentially even central banks (which would make it a digital currency rather than a virtual one). When tokens are exchanged, the transaction is verified by, and broadcast to, a network—with or without information on the parties involved.

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Tokens eliminate the possibility of double spending (not reporting a payment to one party, in order to pay another with the same funds) and reinforce the stability and safety of the system.

Networks for token exchange could bypass large commercial banks with the press of a button and eliminate the need for separate messaging services among banks. Just as email eliminated the distinction between sending letters domestically and internationally, cross-border payments could be greatly simplified using tokens.

Such networks may never take off. Trust is one reason. Will users trust new digital wallet providers with their life savings? Though the transfer and storage of tokens is relatively safe, they are still subject to fraudsters who could instruct the digital wallet to undertake transactions in their favor. And will the value of tokens remain stable over time, relative to the fiat money issued by governments? For now, it does not seem so, but new solutions are constantly being explored, and not all governments can be trusted with the stability of their currency.

There is a good chance that a decade or two from now current financial services will be seen as part of an awkward transition phase that was soon to be superseded. [FD](#)

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