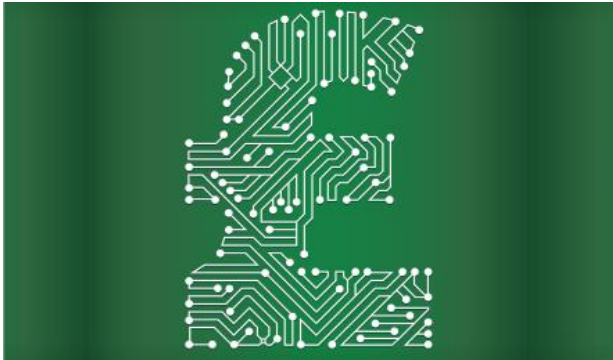




# Financial Technology (FinTech)



Financial Technology (FinTech) describes the application of digital technology to financial services.<sup>1</sup> FinTech presents consumers, businesses and governments with new products and services that may disrupt the financial sector.<sup>2,3</sup> This POSTnote reviews how and why FinTech is being used, and the benefits and challenges it presents to the UK.

## FinTech in the UK

FinTech is changing the types of financial services available, who can access them, and how. For example:

- alternative finance such as peer-to-peer lending allows consumers or firms to obtain loans without using a bank
- data analytics can be applied to an individual's financial data to give them low-cost automated financial advice
- new payment methods, such as apps, allow transactions to be made with a smartphone
- distributed ledger technology (e.g. blockchain) enables new ways of recording and executing transactions.

The Government wants the UK to be the world's leading FinTech centre. It sees FinTech as an opportunity to create jobs and economic growth.<sup>4,5</sup> Estimates suggest that in 2015, UK FinTech:

- was worth roughly £6.6bn in annual revenue
- employed around 61,000 people
- attracted approximately £524m of investment.<sup>6</sup>

Uptake of FinTech by consumers has been attributed to factors including the widespread use of smartphones and the internet,<sup>7</sup> a reduction in consumer confidence towards traditional banks after the financial crisis,<sup>2,7</sup> and the lower costs and convenience of digital financial services.<sup>8</sup> Many new FinTech firms have been created in the UK, enabled by the availability of technology, which has reduced set-up costs and helped new companies to enter the market.<sup>9</sup> Established banks are investing in FinTech start-ups via

## Overview

- FinTech is providing new financial services, including crowdfunding, mobile payments and distributed ledgers such as blockchain.
- FinTech can reduce costs and increase convenience for consumers and firms, and enhance competition among businesses.
- Challenges for regulators include how to protect consumers, yet enable innovation.
- FinTech can increase access to financial services for some, but it is unclear how wide-spread the benefits will be.
- New uses of data through FinTech raises questions over privacy and data security.
- Digital financial services require secure user identification, which can be hard to achieve.

incubators (that provide office space and networking) and accelerators (that offer short mentoring and investment programmes).<sup>6,10</sup> FinTech is concentrated in London but is also developing in Edinburgh, Leeds and Manchester.<sup>6,11</sup>

This note looks at four emerging FinTech areas: alternative finance, data analytics, payments and distributed ledgers. It covers their use and associated challenges, such as access to services, regulation and establishing online identity.

## Alternative Finance

Alternative finance describes a range of investing and donating services accessed via online platforms.<sup>12,13</sup> UK alternative finance had a total transaction volume of £3.2bn in 2015 (an 84% rise from 2014).<sup>14</sup> The largest areas were peer-to-peer lending to businesses (47% of market share) and consumers (28%), and equity crowdfunding (10%).<sup>14</sup> Factors driving the development and use of alternative finance (Box 1) include demand from consumers and businesses for new funding, a lack of other investment opportunities,<sup>15-17</sup> and the speed of online services.<sup>15,18</sup> The Government has committed £100m of investment into the sector via the British Business Bank.<sup>19</sup>

## Peer-to-Peer Lending

Businesses or consumers can obtain loans by borrowing from many individual lenders via an online platform (e.g. Zopa or RateSetter). Loans are then repaid to lenders with interest.<sup>12</sup> Peer-to-peer platforms can offer an alternative to

banks by directly connecting lenders and borrowers. Typically, administering loans through these online platforms is cheaper than via traditional banks, and platforms may use non-traditional data sources to assess credit risk.<sup>17</sup> Platforms can offer more competitive interest rates and increased access to finance for borrowers compared to banks.<sup>12</sup> Interest from peer-to-peer loans is eligible for tax relief through the Innovative Finance ISA,<sup>20</sup> and investors can offset losses incurred against income received for tax purposes.<sup>21</sup> The Government is planning a scheme requiring banks to refer small businesses to alternative finance providers if they deny them a loan.<sup>22</sup>

#### *Regulation and Consumer Protection*

Peer-to-peer lending has been regulated by the Financial Conduct Authority (FCA) since 2014.<sup>16,23</sup> The Peer-to-Peer Finance Association also has self-regulation requirements for its members.<sup>24</sup> The FCA considers peer-to-peer lending to be higher risk than holding money on deposit.<sup>23</sup> Loans are not covered by the Financial Services Compensation Scheme (designed to protect consumers against institutional bankruptcy).<sup>25</sup> Instead, the FCA requires platforms to have a contingency plan to settle loans if they go out of business, although it notes that consumer detriment is possible if arrangements fail to work as expected.<sup>16,26</sup> Processes for dealing with loan defaults differ between platforms.<sup>27</sup>

### **Crowdfunding**

Businesses or individuals can raise money from multiple funders who typically contribute a small sum.<sup>28</sup> This gives them a new way of generating funds for their businesses, projects or charitable ventures, and provides funders with access to a new market. Crowdfunding can be classified by the returns received by funders, for example:

- equity crowdfunding (e.g. CrowdCube or Seedrs)
  - funders receive shares in a business
- rewards crowdfunding (e.g. Kickstarter) – funders receive a non-financial reward such as an acknowledgement
- donation crowdfunding (e.g. Spacehive) – funders receive no material reward.<sup>12</sup>

#### *Regulation and Consumer Protection*

The FCA regulates equity crowdfunding, but not rewards or donation crowdfunding.<sup>23</sup> The industry body, the UK Crowdfunding Association, also has a code of practice for its members.<sup>29</sup> The FCA regards equity crowdfunding as a high-risk investment activity with additional risks compared to peer-to-peer lending.<sup>23</sup> Investors only make a return if the business they back is successful, which may be unlikely due to the high rate of early-stage business failure.<sup>23,25</sup> These risks apply to other types of investments, such as venture capital (funding for start-ups and small businesses). However, the FCA has raised concerns that equity crowdfunding is being used by investors with no previous experience (Box 1) and say that firms need to give investors the information required to understand the risks involved.<sup>30</sup>

A 2014 FCA review of 25 websites (both peer-to-peer lending and crowdfunding platforms) raised concerns over promotions that emphasised benefits of investing without

#### **Box 1. Alternative Finance Use in the UK<sup>12,14</sup>**

- **Peer-to-peer lending.** The main use of peer-to-peer business loans in 2015 was in real estate, predominantly by property developers. (This is in contrast to 2014, when real estate was a minor sector.) The average peer-to-peer business loan in 2015 (excluding real estate) was £73k, and involved 347 lenders. These loans are estimated to be 12% of all national lending to small businesses. A third of peer-to-peer business borrowers in 2014 believed they would have been unlikely to get funds elsewhere. For peer-to-peer consumer lending, the average loan in 2015 was £6.6k. The top three loan uses in 2014 were: vehicle purchase, home improvement and debt consolidation. Around a quarter of peer-to-peer business lenders and a third of peer-to-peer consumer lenders in 2015 were institutions (not individuals).
- **Crowdfunding. Equity crowdfunding** was the largest crowdfunding sector in 2015. It grew by 295% from 2014. Around a quarter of this market was in real-estate investments. Equity crowdfunding (excluding real-estate projects) was an estimated 16% of UK early-stage (seed and venture) equity investment. On average, each investment round raised £523k and involved 77 investors. In 2014, 62% of funders had no prior investment experience, and 38% were professional investors or high net-worth individuals. **Rewards crowdfunding** supported around 6,600 projects in 2015. On average, each project raised a total of £1.4k, from 326 funders. **Donation crowdfunding** totalled £12m in 2015 (a 500% growth from 2014). Around 17,000 projects each raised a total of £7.7k, from 41 donors, on average.

clearly indicating the risks. Concerns were also raised over promotions comparing peer-to-peer loans to savings accounts, potentially suggesting that lenders' capital was secure.<sup>30</sup> Following the review, the FCA found that most firms they contacted changed their websites as requested.<sup>30</sup>

### **Data Analytics**

Use of data analytics is enabling new business models in the financial services (POSTnotes [468](#) and [469](#)).<sup>31</sup> Driven by greater availability of data and analysis tools,<sup>2,32,33</sup> firms are increasingly looking to generate revenue from data.<sup>7</sup> As for all companies, use of personal data by FinTech businesses will be subject to the recently approved EU General Data Protection Regulation that comes into force in 2018.<sup>34</sup>

### **Risk Assessment**

Data about an individual can be used by businesses to calculate personalised risk assessments. This can enable more accurate risk management for companies and greater access to services for some consumers.<sup>35</sup> For instance, installing telematics boxes in a customer's car to gather data on their driving habits allows insurers to calculate personal premiums.<sup>36</sup> Use of new types of data (e.g. social media) in credit assessments can allow people traditionally unable to get loans (e.g. with no credit history) to access them.<sup>17,37,38</sup> However, greater use of personal data raises issues for privacy and data security, and may lead to unintended discrimination. For example, software that looks for correlations between insurance price and other variables (e.g. home address), might unintentionally discriminate against people with certain traits (e.g. ethnicity).<sup>39-41</sup> In response to an FCA investigation of data use by insurers,<sup>42</sup> the Financial Services Consumer Panel raised concerns that consumers may be unaware of how their data are used, and highlighted a need for them to give explicit consent.<sup>43</sup>

## Automation in Financial Advice

Automated advice services use software to provide personal financial advice with little or no human guidance.<sup>44</sup> Data, such as a user's income or risk tolerance, are analysed to recommend specific products or services. For example, companies such as Wealth Horizon<sup>45</sup> provide consumers with automatically-created online investment portfolios.<sup>46</sup> Potential benefits of automated services include lower costs and greater access to advice.<sup>44,46,47</sup> However, risks for consumers include the possibility that they do not understand the limitations of the service or how their data are used, and have a limited ability to seek clarification.<sup>44</sup> If there is an unclear allocation of liability, legal disputes may arise among those developing the tools, those providing the services, and consumers.<sup>44</sup> In a recent review, HM Treasury and the FCA recommended that the FCA creates an Advice Unit to help firms develop automated advice.<sup>48</sup>

## Payments

FinTech is influencing a wide range of payment services used by both consumers and companies.<sup>56</sup> Research suggests that payments had the highest adoption rate of all FinTech products in 2015,<sup>57</sup> and that it was the largest subsector in UK FinTech.<sup>6</sup> Emerging models include:

- **Mobile payments** – smartphones can be used for contactless transactions, online payments, or purchases via an app.<sup>58</sup> For example, Starbucks customers can order and pay for coffee through a pre-paid app.<sup>59</sup>
- **Cross-border payments** – FinTech firms are facilitating low-cost overseas transfers traditionally made via banks. Transferwise matches users wanting to send money in opposite directions overseas, allowing international transfers to be made using (mostly) national payments.
- **Tokenization** – instead of directly giving a vendor sensitive consumer information, such as a credit card number, this information is first converted to a non-sensitive token by a trusted intermediary.<sup>60</sup> This eliminates vendors' access to users' payment data, and can therefore reduce crime risk.<sup>61</sup> Tokenization is currently used in services such as Apple Pay.<sup>62</sup>

### Box 2. The Open Banking Standard and APIs

HM Treasury is developing an Open Banking Standard to enable regulated third-party access to banking data.<sup>49</sup> It plans to phase this in from 2016 to 2019. Under the Standard, banks will provide application programming interfaces (APIs) – tools that allow communication between two pieces of software.<sup>50</sup> With consumers' permission, APIs would give FinTech companies access to customers' banking data. This could be used to provide consumers with services such as apps to manage personal finances or to initiate payments.<sup>51,52</sup>

The Open Banking Working Group developing the standard has said that the Government should further consider several aspects of the proposal, including whether it provides sufficient customer protection and if additional regulation is needed.<sup>49</sup> Third-party access to data will also be required under the revised EU Directive on Payments Services (PSD2). PSD2, which comes into force in January 2018,<sup>53,54</sup> aims to enhance consumer protection, promote innovation and improve the security of payment services.<sup>55</sup> Regulatory standards for PSD2 are being developed by the European Banking Authority and HM Treasury is drafting legislation for its national implementation.<sup>51</sup>

## Regulation and Legislation

A new UK Payment Systems Regulator (PSR) was launched in 2015 to regulate the payments industry.<sup>63</sup> The PSR has set up a forum to develop a strategy for the sector,<sup>64</sup> and is reviewing access to, and provision of, UK payment systems (e.g. Bacs, Faster Payments and LINK).<sup>65,66</sup> Payments infrastructure is currently owned by a small number of banks.<sup>66</sup> The PSR says that this does not provide effective competition and has proposed that owners should sell part of their stake.<sup>66,67</sup> The payments and banking sectors will be affected by new legislation to open up banking data to third parties (Box 2), which could provide increased competition and new services for consumers. Concerns have been raised over consumers' privacy<sup>68,69</sup> and the potential for their data to be used fraudulently.<sup>52</sup>

## Distributed Ledger Technology (DLT)

Distributed ledgers are digital records that can be shared among many different locations or users, without needing to have a central intermediary.<sup>70,71</sup> The characteristics of distributed ledgers vary, but all involve distributed and secure information sharing (Box 3).<sup>72</sup> DLT was originally developed for digital currencies<sup>73</sup> (the blockchain ledger, which underpins Bitcoin), and these currencies remain the main use of the technology (POSTnote [475](#)). However, DLT could be used more broadly (Box 4),<sup>74</sup> and outside of FinTech,<sup>70</sup> since it provides a way of creating securely shared records for essentially any asset or transaction. An estimate suggests that globally, DLT firms attracted around \$490m (£350m) in early-stage investment in 2015.<sup>75</sup> DLT research is receiving support from public funding bodies.<sup>76,77</sup>

## Challenges for Distributed Ledger Technology

DLT is at an early stage of development, and its full implications remain to be seen.<sup>70</sup> There is little regulation specific to DLT, although HM Treasury has announced it will apply anti-money laundering regulation to marketplaces for trading digital currencies.<sup>78</sup> Use of DLT in general poses a number of questions, including: how it will affect central institutions such as governments; how it might be regulated if there is no single legal entity in charge; how to address the technical and commercial challenges of scaling DLT for widespread use; and how to maximise its benefits.<sup>70,72</sup>

### Box 3. Characteristics of Distributed Ledger Technology

Two key features of distributed ledger technology are:

- **Distributed storage** – identical copies of the ledger are stored by multiple parties. This removes central points of failure, allowing the ledger to be recovered if a copy is corrupted, and removes ambiguities in record-keeping (as the ledger is visible to all).<sup>70</sup>
- **Mathematical security** – the use of cryptography (the encoding and decoding of information) allows information to be time-stamped, and securely recorded. This provides a robust way of verifying the transfer of information between different parties.<sup>70</sup>

Depending on the ledger, different users can be given different rights to access and modify individual records. Some may have permission to alter records, while others may only view them.<sup>70</sup> This can enable transparency by opening up records to a defined set of people, and improve privacy by controlling what is shared and with whom.<sup>70</sup>

**Box 4. Potential Applications of Distributed Ledger Technology**

- **Supply-chain transparency.** A distributed ledger could record the trade and transport details of an item, by associating it with a digital identity.<sup>79</sup> For example, the Everledger system uses DLT to track the trade and movement of diamonds, providing a way of transparently recording ownership history and reducing crime.<sup>70,80</sup>
- **Smart contracts.** DLT could facilitate smart contracts that can be executed and enforced automatically, without the need for intermediaries.<sup>70,72,74,81,82</sup> For example, a smart contract could be created for flight insurance – if a flight was delayed or cancelled, the contract could automatically initiate the claim and pay the policy holder.<sup>83</sup> Smart contracts could reduce contracting and enforcement costs.<sup>70</sup> However, they are at an early stage of development, and their legal status is unclear.<sup>72</sup>
- **Government operations.** Distributed ledgers might be used in a range of government services.<sup>70</sup> DWP is investigating how DLT could be used to deliver welfare support. DLT, in conjunction with physical identification (such as a fingerprint recorded on a smartphone) could be used to verify a claimant's identity and transfer funds to their mobile phone. This could enable payments to be used only by the intended recipient, and could reduce fraud and overpayments (which are currently estimated at £5bn per year).<sup>70,84</sup> The National Archives is also exploring the possibility of using distributed ledgers to ensure the long-term integrity of digital public records. This scheme could use a ledger that only the Government could modify, and everyone else could view.
- **Financial transactions.** DLT has applications for settling transactions. FinTech firm R3 recently completed a trial with 40 major banks that simulated using distributed ledgers to execute instant global financial transactions.<sup>85</sup> The Bank of England is also investigating using DLT for a central bank run digital currency.<sup>86,87</sup>

**Box 5. The FCA's Project Innovate**

Alongside providing innovative businesses with regulatory guidance, the FCA's Project Innovate is developing other initiatives such as:

- **The regulatory sandbox** – a controlled environment in which businesses can trial new ideas on real consumers. This will allow businesses to test products without the normal regulation associated with pilot activities, and enable new products to enter the market.<sup>95</sup> The sandbox recently opened for applications, and testing is due to begin later in 2016.<sup>96</sup>
- **Regulatory Technology (RegTech)** – this refers to how data and technology can be used in regulation. For example, RegTech could help businesses to achieve regulatory compliance using technology such as automated and real-time reporting.<sup>97,98,2</sup> It could make compliance easier and less costly, while improving transparency and accountability.<sup>2,98</sup> RegTech also presents a potential market opportunity for FinTech firms to develop new regulatory tools.<sup>2</sup>

**Regulation of Financial Innovation**

The FinTech market has evolved rapidly, creating new products and services for consumers. This presents a challenge for regulators: how to promote competition in the interest of consumers, while ensuring an appropriate degree of consumer protection.<sup>2</sup> To help address this, the FCA launched Project Innovate in 2014 (Box 5).<sup>99</sup>

**Identity and Cybersecurity**

Digital financial services require a secure way for different parties to prove their identity online. This establishes the trust needed to perform transactions and mitigates against identity crime, such as fraud.<sup>100</sup> There is no consistent approach to confirming a person's identity online in the UK.<sup>101</sup> Physical biometric data, such as fingerprint recognition, is one tool being considered by some FinTech firms. The online bank Atom has developed facial and voice recognition security checks for its app (POSTnote [509](#)).<sup>102</sup> Others suggest that behavioural biometrics, such as how someone types on their phone, could be preferable as they may be harder to replicate.<sup>103</sup>

Industry and others have proposed that a cross-service digital ID scheme is needed.<sup>100</sup> This could give consumers a single digital ID to access a range of online services. Proposed benefits include greater user convenience and reduced regulatory burdens associated with identity provision across multiple systems.<sup>100</sup> In Estonia, a government-led digital ID scheme uses DLT to provide access to private and public sector services online, such as electronic health records, tax declaration and banking. The UK Government's identity assurance scheme GOV.UK Verify, which uses certified companies (such as the Post Office) for identity verification, aims to provide a single point of identity verification for multiple online Government services as well as developing the ID services market.<sup>104</sup>

**Challenges****Financial Inclusion**

Financial inclusion refers to the accessibility of financial services to all adults in society.<sup>88</sup> FinTech could increase financial inclusion by providing tools and education for those who are not catered for by existing services. For example:

- M-PESA (launched in Kenya) enables users with no bank account to transfer money using their mobile phones.<sup>89</sup>
- Squirrel offers users help to manage their finances by controlling when they can access their savings.<sup>90</sup>
- FriendlyScore uses social media data to assess creditworthiness, which may improve access to finance.<sup>91</sup>

However, digital financial services are not equally accessible across society. The Financial Inclusion Commission suggests that the benefits of technology may be less likely to reach those on low incomes, since they are a less profitable market.<sup>88</sup> A 2015 survey found that adoption of FinTech tended to be higher among younger, higher-income and urban-dwelling people.<sup>8</sup> FinTech may be hard to access for the digitally excluded, i.e. those who don't have the skills or technology to use digital services.<sup>88,92</sup> Ofcom estimated that 34% of UK adults did not have a smartphone in 2015 (first quarter).<sup>93</sup> Greater use of digital financial services may lead to a reduced provision of physical alternatives, which could disadvantage those who rely on high-street branches to manage their money.<sup>94</sup>

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