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Fintech: hype or reality?



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POLICY BRIEF

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International Public Policy Institute (IPPI),
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I Defining the Term

Fintech is a term given to financial technology in the digital age. At its core sit the twin concepts of blockchain and distributed ledgers. These technology solutions bring with them the promise of faster, cheaper, more secure and transparent financial transactions over the internet.¹

In a more widely used context, Fintech is conceived and even defined as enabling disruptive innovation in financial markets and financial services.

II Background

This briefing explains what Fintech is and investigates whether the promise of Fintech is hype or reality. It also highlights the resultant policy implications that are generated by the phenomena and what issues lawmakers should be cognisant of.

It is evident that Fintech is changing virtually every day. The term means many different things to many different people, partly because there is a breathless focus on its potential benefits, without properly noting the associated shortcomings and/or challenges.

The popular perception of Fintech is that it refers to the impact of developments in the modern (and still rapidly evolving) world of the internet, alongside access to the escalating amounts of data that are being generated - so called 'big data'. The impact is largely seen to be on the manner in which financial counterparties operate and how they inter-relate with others in the sector. This is believed to have a potential disruptive impact, in particular for customers of financial products and across the wider economy. Economists call this impact disintermediation and it essentially means cutting out the financial middle man.

That impact of the greater use of blockchain, distributed ledgers and the internet is likely to include a major influence on the efficiency of and competitiveness within the financial sector. As a result, Fintech can potentially reduce costs and feed through to the understanding of and treatment of risks. There will be significant downward pressure on the quantum of labour required, in particular within the banking and insurance sectors, if clearing and settlement

¹ [https://pure.strath.ac.uk/portal/en/publications/blockchain-and-its-use-in-financial-settlements-and-transactions\(Ocf1dde2-c27f-417d-b235-ceec58ffea32\).html](https://pure.strath.ac.uk/portal/en/publications/blockchain-and-its-use-in-financial-settlements-and-transactions(Ocf1dde2-c27f-417d-b235-ceec58ffea32).html)

operations are further automated through such technology. There will be an associated shift to more specialised skill requirements, particularly in respect of programming and data analytics. There will also most likely be changes to the very nature of services that can be provided across the financial spectrum, particularly using mobile devices and over the internet.

Generally, the discussion of Fintech in the financial media refers to innovative and disruptive technologies that affect the delivery of financial services as we know them. The relationships that develop from this quite particular form of Fintech activity include those with

- (i) established providers, like banks and other institutions, who may be looking for ways of exploiting these disruptive technologies to provide the same financial service, such as lending or insurance;
- (ii) regulators, mindful of the risks for customers and systems of such innovations; and
- (iii) customers, who may welcome increased choice or convenience or lower costs,

or some combination of all three.

The aspects of Fintech which are less well-described and less prominent in day to day discourse, perhaps because they are more esoteric, include the creation and adoption of different ways of storing value, such as crypto-currencies (internet based digital money). The concept even leads some to question the future of cash². The current central banking system and nature of interest rates are all built around strict control over the supply of money. Any changes in such relationships will impact not just the ability to regulate the economy but also state functions such as tax collection and the welfare state. Currently, the infrastructure is built around centralized ledgers, not decentralized ones. The future of centralised clearance and settlement systems has to be thought through by policy makers, as do the implications for financial markets and central banking of new kinds of value transfer.

Blockchain has the ability to deliver real-time, reliable financial data to everyone who uses the internet, and create a system where users and policy makers have equal confidence in the data it records. Theoretically this should lead to a democratization of financial services. Money remittances, for example, will no longer incur usury charges. Payments will more likely be done using a device other than cash. Policy makers will have to either embrace the knowledge and understanding emerging from the data generated (the optimistic view) or address new kinds of rent-seeking within the industry, disguised systemic risk and other threats to resilience (the pessimistic³).

The key elements of Fintech's impact can be identified as: -

² <https://www.nytimes.com/2017/01/10/magazine/should-we-trash-cash.html?>

³ For a trivial illustration of Fintech-enabled malfeasance, see <https://www.nytimes.com/2017/01/30/world/europe/hotel-austria-bitcoin-ransom.html>

Increasing efficiency by better use of technology, reducing silos and producing more integration; inter alia this will be facilitated by the move from bank to bank reconciliation to blockchain authentication. Such developments are likely to see those with knowledge of the functioning of the financial markets working in conjunction with those who have programming and data analytical skills. Policy makers should promote this trend but with caution, by encouraging forward-looking service providers. The skills and knowledge of both partners will be critical to success. However, the risk will remain that those creating these new products, and those regulating them, will not have a full grasp of the potential consequences of their use.

Facilitating greater mobile transactions; the pace of this development is rapidly accelerating, for people of all ages and cultures. The emerging generations will expect (and be expected) to perform the great majority of tasks – finance and retail-related – on line and via a hand-held or other internet enabled devices.

Analysing and processing big data to better identify customers' interests and preferences; more and more data is being collected in a variety of different ways. The key task for many will be working out which data may have value in relation to customers, how to best access and manipulate such data while striking the best balance between the interests of customer and provider; and how to avoid getting lost in the trees rather than seeing the wood that matters. There will also be increasing emphasis on monetising big data, i.e. extracting value where such data amounts to a scarce resource.

Calibrating risk – the use of data analytics allows a better understanding of financial parameters. It allows accessing real data from individuals that means each person's risk profile (and that of each business) is far better understood. Policy makers should appreciate that data alone will not do the job. It is necessary to understand inter-relations and correlations; to develop and test hypotheses so that better and more data does mean better risk assessment rather than simply more computer analysis to no great benefit. One related risk is that the development of these tools is outstripping the ability of the toolmakers to use them safely. Flawed or biased algorithms will be dangerous to all.

Automated financial algorithms; some decisions may be ripe to hand over to technology. These will be simple decisions, in the sense that an algorithm can readily be written to produce decisions over time without the need for human intervention. Policy makers should insist that oversight must still be maintained, to avoid the risk of the unexpected events and 'unknown unknowns'. These can result in unpredicted outcomes which do not fit in with prior expectations and wishes.

Speed; by eliminating the need to reconcile a transaction in a back office procedure through a central clearing party, the process of settlements and clearing becomes instant.

The digital element of Fintech activity adds to risks associated with on line activity. The so-called 'double spending' problem has to be addressed. This is, in effect, the problem that digital information can be copied and pasted. **Cyber security is a major and growing concern.** Can the pace of improvements in cyber security keep up with the escalating efforts of hackers and cyber criminals? Concerns here may prove the greatest constraint on the speed and extent of Fintech developments.⁴ To some extent, the mechanics behind blockchain address many of the security systems, although financial systems still remain vulnerable to so called 51% attacks, where over half the secure identifiers in a blockchain command are compromised.

Given the wide variety of effects, Fintech is typically examined on a sub-sector by sub-sector basis. Each sub sector may find one or more of the elements identified above of relevance. There is no scope for identifying on a top-down basis what the overall effect is likely to be. Bottom up is the required route. That is the manner in which we now proceed.

III The Impact of Fintech

This examination relates to the UK financial sector as a whole, rather than just those elements based in Scotland but first we make a mild diversion to address the question of tax.

(i) Fintech and Tax

There remains a great deal of legal uncertainty about Fintech. These include the status of virtual currencies as a medium of exchange. For example, which entities can issue them; in which jurisdiction is an online transaction taking place and to what extent can tax authorities use financial data that is online but not submitted to them by the taxed party? Perhaps more importantly, how is the value of the currency, which, like all currencies, is determined by the willingness of counterparties to accept it, protected or even guaranteed?

Another question related to virtual currencies is how to treat them for tax purposes. In the US legal steps are in train to secure information on who is using 'Coinbase' – the largest virtual currency exchange – and to what extent. The argument is that Coinbase and other such virtual currencies do amount to a store of value and their purchase, sale or exchange equates to transactions in standard currencies or other stores of value – housing for example. Therefore gains (and indeed losses) in such 'transactions' should be known to the tax authorities and their tax implications duly considered. In Germany, bitcoin, another crypto-currency, is permitted for tax returns. Tax authorities in the UK have yet to take a view.

At present crypto-currency transactions are recorded on a distributed ledger but only a cryptographic hash identifier shows who is involved in the transactions. The US Internal

⁴ <https://www.thecityuk.com/news/cyber-and-the-city-speech-by-john-mcfarlane/>

Revenue Service (IRS) has deemed virtual currencies to be property, and hence, one must assume, taxable.⁵

Another tax-related policy issue is that big-data technology and techniques can be used to enhance the ability of tax bodies to assess tax liabilities of individuals and corporations. Different sources may make it easier to check if and when individuals have visited different locations; and likewise may reveal expenditure details which may or may not be compatible with reported incomes/revenues. Further more sophisticated means of applying taxes may be feasible, as data tells the authorities more about use of assets and indeed variations in their value due to external factors such as differing environmental quality, etc. In sum hiding anything may be more difficult in the world ahead; if data exists then this can be found and acquired – albeit generally at a price.

These tax-related questions raise a much bigger issue, outside the scope of this paper, namely the contribution of Fintech to the growth of surveillance by the state, or other authorities, and the use of harvested data to manipulate and influence attitudes and activities among the governed.⁶

(ii) Banks

Fintech may change the operational backbone of banks. It has the potential to move them from central ledgers to distributed ledgers, thereby enabling many activities, such as peer to peer transactions and open banking, where data is shared securely. The Competition and Markets Authority support Open Banking⁷, concerned as they are about the lack of transferability in banking products, requiring all banks to have it in place by 2018.

The first effects of Fintech on personal and small business banking have been evident for several years now. More and more transactions take place without cash, cheques or branches being involved. On-line and telephone banking are increasingly common; and increasingly purchases and payments are being made via the web. Bank branches are increasingly rare.

These changes have brought benefits to customers and cost savings to providers, and are opening up parts of the banking sector to competition from smaller, so-called ‘challenger’, banks. These new entrants can take advantage of readily available technology to compete with longer-established rivals in providing a host of mobile services, without any call for a branch network or, indeed, legacy IT systems. This should lead to more competition in retail banking,

⁵ New York Times December 5th 2016 – ‘As Fintech Comes of Age, Government Seeks an Oversight Role’ by Peter J Hennings

⁶ <https://www.scientificamerican.com/article/will-democracy-survive-big-data-and-artificial-intelligence/>

⁷ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/544943/what-is-open-banking.pdf

and hence cheaper and better services for customers. (The extent of competition for personal and – particularly - small business customer business has previously been very limited, especially in Scotland.)

The new entrants are not doing anything that their incumbent competitors cannot or could not do, and indeed the latter are striving to keep up with, or ahead of, the new entrants in these new areas. Often these established banks will work with Fintech companies, because the latter have the specialist skills to provide the ‘solutions’ banks require. The Fintech companies know that they also need the banks, for access to customers and a whole host of payment systems.⁸

Another aspect of Fintech is peer to peer lending (P2P). This is facilitated by platforms that put individuals who wish to lend for a given interest rate in direct contact with those that wish to borrow. There has been a major increase in the extent of P2P lending to small and medium-scale enterprises (SMEs). The Governor of the Bank of England has stated recently⁹ that in the UK P2P accounts for 14% of new lending to SMEs and that ‘more than half of these credits were unlikely to have been provided by existing banks’. So not only is competition increasing but new credit is being created and access to credit for SMEs may be on the increase; but at greater risk, perhaps?

Further developments are also underway. Regulation, compliance and anti –money laundering work has passed to low cost, overseas, locations, with major increases in the numbers employed. Now work in this field is moving onwards to automated systems involving artificial intelligence. Costs seem likely to fall sharply once more, and potentially thousands of jobs will be superseded.¹⁰

Policy makers might consider a revision of KYC – know your customer – requirements in the light of Fintech capabilities. Indeed, the prospect of new regulatory services to all banks, provided by specialised external agencies, is emerging. This would result in both savings and job reductions, but as with so much on the Fintech front would also expose customers to risks – what if this agency was hacked and a range of customer information across a range of financial institutions made available to others?

One example that is well known is PayPal. This is a payment technology company which now provides loans to its customers, with eligibility largely determined from information already

⁸ Of course payment systems themselves have changed as Fintech evolves and are set to change even further perhaps permitting more payments to be made directly and without making use of systems *per se*.

⁹ ‘The Promise of Fintech – Something New under the Sun?’ – Speech by Mark Carney to the Bundesbank G20 conference on 25 January 2017.

¹⁰ Banks’ AI Plans pose Threats to Thousands of Jobs; Martin Arnold FT 25th January 2017.

gathered during the client relationship. This is a form of lending similar to the use of a credit card but points the way towards a data-driven approach to credit creation. The creation of credit in the economy is a major function of banks which might become less risky for individual lenders, though the systemic impacts of technology are unpredictable. Recording, constraining/limiting and regulating consumer and small business credit will become increasingly complex but also increasingly necessary.

(iii) Actuaries, accountants and financial reporting

Fintech also promises to make financial reporting faster and more accurate. There is a clear need to reduce frictions within the current inefficient system of financial reporting. The average large listed company uses more than 800 spreadsheets to prepare its financial statements. Assembling such reports is a typically inefficient and error-prone process. Manually transferring data can be done away with by automation, using intelligent digital-based financial reporting.

The question is frequently asked: will actuaries be replaced by algorithms? In other words, if we have sufficient data, with sufficiently sophisticated and self-learning ways of manipulating them, will we any longer need people to calculate risks?

The consensus is currently against this, while noting that the question is about the role of artificial intelligence, much more than it is about the gathering and manipulation of data.

(iv) Insurance

It is not just banks that face change. All financial sectors will become more efficient, in terms of reduced transactional friction, and face disintermediation. There is a sub world of Fintech called 'insuretech'. The insurance industry will also need to determine the advantages and drawbacks of data-driven innovations. More data may well lead to more fine-grained risk analysis; but it will also fragment the market. .

Insurance, of whatever kind, is a means of pooling risk and allowing things to happen which, without it, would involve the risk of catastrophic financial loss. Activities such as driving cars, building bridges or skiing can go wrong and, when they do, the costs can be high for the people concerned. However, they go wrong sufficiently infrequently to make it sensible and financially attractive for all those involved to pay a relatively small sum of money, in return for a guarantee that their costs will be covered if they are unlucky. That system works because nobody can be sure that they will not be unlucky – that is in the nature of luck. However, if vastly more information about the nature of each insured risk becomes available, the role of luck can be reduced, as is the case with Insuretech.

The potential changes in the economics of insurance are many. There are already some companies offering lower prices for life insurance to those who agree to share data about their lifestyles. 'Insuretech' is a significant subset of 'Fintech' and it covers not only changes to the

business of underwriting risk but also back office and distribution functions. New Fintech companies are not likely to become insurers of risk themselves, in the way that they might become investment advisers, because the capital and regulatory requirements are so large. But they are disrupting established models and practices.

Some disruptions so far include offering car insurance by the hour, as opposed to annually; offering specialist insurance against cyberattacks (we note elsewhere the importance of cybersecurity); using data to improve the delivery of healthcare insurance; insurance for the 'shared economy', such as insuring someone for risks associated with occasional renting out of a room; using social media connections to assess credit risk; insurance for all sorts of products at point of sale; and gathering data on which road junctions have more accidents than others, with the potential to charge regular users more, or those who avoid them less.

It seems likely that new businesses will arise where data can be monetised. To take the last example above, if data can be gathered, in real time, on the actions (and their consequences) of all drivers in a city, then the possibilities for slicing and dicing that data for underwriting, charging and risk management are extensive. The raw data will be very valuable to insurers and the insured but it need not necessarily be owned by them and the owner of the data need not offer insurance services – it could act as a broker or simply a data provider, like the Met Office selling its historical weather data to insurers of infrastructure.

(v) Pensions

Fintech can facilitate the segregation of accounts in a secure way, linking them to financial markets and payment. Consequently, the pensions industry will be able to better customise its offerings right down to the individual level. An obvious benefit for the pension-holder is greater transparency and understanding of entitlements and expectations. If 'big data' is big enough, then assessments of likely investment performance should be more detailed and better presented. The trade-offs between taking money out now and leaving it longer should be more visible – not that forecasting fund performance will necessarily be improved.

As time passes, and data and analysis about demographics and life expectancy become more numerous, actuarial calculations could become more refined and more reliable.¹¹ Pension funds, as major long-term investors, will be a big part of any Fintech-driven transformation of the investment process.

Many people working in the pensions industry are providing back and mid-office services. As with other sectors of the economy, there are reasons to expect these services to change

¹¹ However, work one of us is engaged with elsewhere has pointed to marked and unpredicted changes in mortality data in Scotland and elsewhere. Changes are not always such that they can be readily predicted by actuaries' models. See IPPI blog posts by Jeremy Peat.

radically. Again as elsewhere it appears as if low and medium skilled jobs are most at risk, although this may change over time.

(vi) Investment Management

Fintech can theoretically produce solutions that connect savings products with financial asset pricing in a real time basis. As such, asset liability matching can be done on a second by second basis. Financial capital asset pricing models can be linked to preferences to create automated best investment outcomes and hence optimal portfolios for individuals. These can be managed by what are termed robo-advisors, automated algorithms.

Mark Carney, the Governor of the Bank of England,¹² warned that 'robo-advice and risk management algorithms may lead to excess volatility or increased pro-cyclicality as a result of herding, particularly if the underlying algorithms are overly sensitive to price movements or highly correlated.' If one advisor is away from the herd is this good news, or bad?

The policy questions that must be asked are; (1) what value is actually added to investment decision-making by the 'expert'; and (2) could an algorithm do just as well for all but the most sophisticated investors?

Already tracker funds have taken a good deal of the effort out of investing and often perform far better than funds hand-picked by 'experts'. The emerging generation of investors may be more than content to select an 'app' that enables them to set out simply their own preferences and risk profile, and then leave technology to do the rest. Older or more traditional investors may find that this solution works for part of their capital, leaving another part to be managed in a more traditional manner – involving face-to-face discussions with their adviser and some input of their own preferences and judgements.

The cost of the automated route could be dramatically – 75%+ - lower than the expert way. The availability of this option may be expected to put downward pressure on fees across the board. Would a soundly based algorithm be expected to be any less successful in earning returns than the expert route? In this world of low interest rates and masses of big data sources it is difficult to see how the expert can be expected to make judgements more successfully than the app that accesses and analyses data sources. But success is difficult to forecast. The experienced investor knows that a period of past success by one advisor is most certainly not a strong indicator of success in the future!¹³

¹² Op cit

¹³ It is not unknown for pension funds to decide to switch between investors to avoid staying with one who has had a good run – on the grounds that this is unlikely to be continued. Better to switch to one deemed of equally good quality which is due a good run!

There is also the prospect of new, data-driven, approaches to investing. There are momentum investors (who track the movements of the market) and value investors (who invest according to their judgement of a company's intrinsic value and its chances of relative success). It seems conceivable not only that these approaches will become more refined, as more and more data can be incorporated into decisions (though if everyone is doing the same thing in general, competitive advantage will be secured at the margins), but also that hitherto invisible patterns will emerge, in the data available to investors, that might make entirely new approaches viable. Of course, these are not, by definition, knowable in advance. We are reminded of the answer given by the great scientist and science fiction writer, Arthur C Clarke, when asked by a radio interviewer whether there could be unknown civilizations elsewhere in the universe: "There could be, but we don't know about them".

IV Policy implications

It is nigh on impossible to produce a coherent view of what the implications of Fintech may be across the financial sector and beyond but they will doubtless be many. Rapid evolution is inevitable and by its very nature at least partially unpredictable. Policy makers should therefore focus on facilitating the adoption of the new technologies, while keeping in mind the law of unintended consequences (a very big ask) and on the regulatory issues that disintermediation brings with it; whilst keeping a close eye on the evolving risks.

The legacy world of finance is being left behind. The 'expert human' guiding hand is being (to a variable extent) replaced by the mathematical model, automation and the application of big data. Often but not always this will be to the benefit of consumers. The headcount required in reconciliation and checking will reduce whilst at the same time the accuracy and speed should increase.

Some of the risks are clear and it behoves policy makers to think of these now before the perceived myth becomes the reality. Hacking is now seen to be possible anywhere, and data are not safe anywhere. Cyber security will be a priority but there can be no guarantee that even the best security will keep ahead of the hackers' ingenuity.

Policy makers should appreciate that no model is inevitably correct. They have to build in flexibility as financial markets are dynamic. The best models are founded upon sound and well tested hypotheses and well known and trustworthy data. Fintech will demand more and more use of different types of big data, not always as fully tested and trusted as would be ideal; and models may be deployed before they are sufficiently prepared. For companies the gains will come at the margin - from getting ahead of the field. But at the same time the risk of moving too swiftly is evident.

New entrants will emerge and seek to rapidly gain market share in different areas. The pace of change is rapid but sound reputations take time to be built. This is where policy makers have to lend some guidance and advice to consumers. A lower cost may imply higher risks rather than just greater efficiency. A majority of customers will not be well placed to judge the efficacy of what is being offered. At times the 'tortoise' provider may still be preferable to the 'hare'.

Fintech will contribute further to the hollowing out of the labour market. Medium skill jobs across the piece will be replaced by models and algorithms. This replacement may take place as much in overseas labour markets – the past beneficiaries of 'offshoring' – as at home. The top tier technician will be a prize sought out by all and rewarded like a premier league footballer – for as long as his skill premium survives.

There should be genuine gains in efficiency and in enhanced competition. Better targeted insurance products will be a strong example of greater efficiency and the opening up of the retail and small business banking one of the latter. Regulation and oversight will be as essential as ever, probably more so. Can the regulator keep ahead of the innovator? Can the tax man make use of new opportunities rather than letting the tax avoider abuse the benefits of big data, etc.? The public sector will have a high demand for those of super skills but not necessarily the means to compete in the relevant labour market.

As data-driven innovation creates new markets and new ways of trading, as well as a breathless concern to keep up with the competition, the question identified by Professor John Kay¹⁴, of 'interactive complexity', seems relevant and urgent. In a word of caution for policy makers he argues that, for regulatory design : "Two features render systems particularly prone to failure: interactive complexity, which means that everything depends on everything else; and tight coupling, which means that there is little slack to permit self-repair or recovery." It seems highly likely that the significance of these two aspects of the overall financial system will be greatly increased by data-driven innovation.

We raise many questions. What will the consequences be for the concentration and appreciation for risk? The experience of the financial crisis is not reassuring. And activities which become mainstream but which cannot happen without the facilitation of technology are obviously a source of systemic risk. If a dataset or a whole set of relationships goes down, how do we recover? Fintech presents a set of challenges for all in the financial sector. It is evolving so fast that in six months' time the challenges will be seen as different just as the risks and opportunities will be changing. Policy makers have to act now to ensure the right framework is in place for the future of digital finance that these developments will bring.

¹⁴ <https://www.johnkay.com/2013/11/13/the-design-flaws-that-lead-to-financial-explosions/>

V Conclusion

In answer to our original question, is Fintech hype or reality, we conclude that it is developing rapidly, utilizing software and programming code in innovative ways and is here to stay. In that respect, it is very much reality. Financial technology has been around for the last half century. It is now adapting to a digital online world. This is driving efficiency up and costs down. The digitalization of transactions is now cross disciplinary. There is plenty of 'froth' in the discourse on Fintech, but it does represent both a big opportunity and a big threat to the financial sector. It is a time for calm appraisal and it remains to be seen whether the industry and its regulators can keep in step, one with the other.

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