



SOMO

Fintech's red flags

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Content

Why raise red Flags about Fintech?	3
01. A short overview of the Fintech industry	6
02. Fintech's red flags	11
03. The way forward	36
References	40
Glossary	50

Why raise red flags about fintech?

Around the world, people increasingly use their phones or other **mobile devices** for payments or digitally manage their **personal finances**. With a **few clicks** people can take out the **cheapest car insurance policy** or **start investing** in the stock market **without any expertise**.

This digitalisation of financial services uses many so-called '**fintech**' **applications**. Fintech innovations are globally **developing at a rapid pace** and have been adopted across the financial system, including creating and trading crypto-currencies as new money and assets.

People's experience of the benefits of fintech, especially its ease of use and cost saving, not in the least during the Covid-19 lock-down, has boosted the sector. A large number of fintech start-ups arose, with the highest number in the Americas: estimated at 10.755 by November 2021.¹ This fintech development attracted various investors, with private investors having poured an estimated \$ 353 billion (bn) in non-listed fintech companies from 2018 to 2022.²

Many governments and financial authorities, nationally and worldwide³, support and promote fintech innovative applications because these are seen as serving people to whom banks failed to provide accessible and useful services, and providing better support for the economy in general. Fintech's rise has disrupted and diversified the dominant banking sector. Governments and authorities are now even exploring and introducing their own fintech applications and crypto-currencies.

Concerns are rising about new abusive practices and risks associated with fintech, including risks of losing money from fraudulent applications, breaches of data privacy, new forms of exclusions (e.g. denied insurance), and risks of a financial crisis. Fintech is claimed to result in a paradigm shift by blurring boundaries between financial, technological and economic sectors. However, there is little awareness among citizens of the hazards that can affect their finances and privacy, or the wider economy and society. Nor are they involved in decision making to shape and regulate fintech applications and providers to serve the public interest.

Fintech raises many questions that require answers. Who wins and who loses with the growth of fintech? What market power shifts are at play? Are governments and authorities capable of protecting consumers and citizens? Does fintech help the transition towards more inclusive, socially and environmentally sustainable societies? What future challenges will fintech innovation pose to society?

Aim and contents of this paper

This paper aims to inform civil society in an accessible way about fintech-associated risks and harmful practices – current and future. It intends to stimulate debates about how to urgently address these issues with the public interest at heart, based on further monitoring and research.

The paper starts by briefly describing what fintech is and who the various fintech providers are – fintech firms, big tech firms and big finance firms – with examples of their applications in the banking, insurance and investment sectors. The main body of the paper discusses ‘red flags’ that indicate the hazards, risks, harms, and negative impacts arising from fintech. A final short chapter in this paper raises issues whether and how fintech could prioritise current and future needs of sustainable societies.

The [red flags](#) are summarised in the various titles in red and concluding paragraph of each main section. A separate [summary](#) briefing provides a short overview of the main red flags. A glossary is separately available [here](#).

Methodology used to raise the red flags

Research for this paper began by mapping the current and potential hazards and problems arising from fintech applications for each part of the financial system: banking, insurance, investment, and the crypto-asset industry. The mapping also covered the various players in the fintech context: fintech companies, big tech companies, the finance industry, governments, and regulatory or supervisory financial authorities. The research drew on the work of academics and regulatory authorities, articles in specialised media, annual accounts and websites of fintech companies, interviews, and attendance at fintech industry and public events. Based on the mapping, the paper attempts to summarise the main ‘red flags’ in an accessible way. Footnotes may refer to examples of a wider fintech problem.

A short overview of the fintech industry

What is fintech?

Fintech in this paper refers to **digital provision of financial services** by using innovative technologies, software, mobile devices, Internet and other novel digital or electronic technologies, right up to artificial intelligence and machine learning.

It also refers to **digital services** that operate in-house processes of the **finance industry**, embedding payment applications in non financial firms, and tools for creating, storing and using crypto-currencies. Fintech refers to new business models, applications, processes, and products that are transforming the provision of financial services, beyond simple online traditional financial services.

Fintech is applied in simple or complex forms for all kinds of financial services ranging from payments, lending and other banking activities, to insurance coverage, investment industry operations, and crypto-currencies' related services.

Many different players are involved in this as briefly explained below: specialised fintech companies, big tech companies, and the traditional large players in the finance industry ('big finance').

The wonderful world of fintech actors and applications

The fintech industry consists of large fintech companies whose shares are traded on public stock exchanges, fintech 'unicorns' (non-listed firms valued at more than \$ 1 billion each), and a myriad of smaller fintech firms and start-ups.

Fintech companies (also known as 'fintechs') specialise in digitally facilitating and providing financial services, by using software, application programme interfaces (APIs), platforms and new technologies such as QR codes, e-wallets, digital identification (e-ID), and blockchain or distributed ledger technology. They facilitate cashless online payments and lending, crowdfunding, insurance services, and securities' trading and all kind of investments. Increasingly, artificial intelligence (AI) and machine learning (ML) is applied, such as in portfolio investment, with algorithms for investment apps that facilitate securities' trading based on automatic processing of a wide range of data.

A majority of successful fintechs are related to payment services, including large players such as PayPal, Stripe, Shopify and Adyen.⁴ Not all fintechs have a banking or other finance licence, and then

they will partner with a regulated bank or other financial company to operate the back office and execute the service.

Particular fintechs but also big techs provide 'cloud' infrastructure and services to banks and others in the financial industry as well as to other fintechs to remotely operate their IT programming, software management, data storage and data analysis, or to support their blockchain applications.⁵

A few fintechs offer software so that non-financial companies can themselves process payments or provide loans ('embedded finance').

Also categorised as fintechs are fully digital banks, peer-to-peer lending and crowdfunding companies, insurance companies, online brokers, and so on, who have no physical branches. They use new business models, for example activist investment apps to actively try and influence financial markets.

One very well-known fintech application has been the use of blockchain or distributed ledger technology, for new kinds of digital or crypto-currencies. More than 21,000 different crypto-currencies had been created by November 2022, but more than half of them have not survived or are inactive.⁶ In addition, fintechs provide online trading platforms, exchanges, storage, and 'mining' for digital currencies. Crypto-currencies, and stablecoins (which can be exchanged at the value of a predetermined official currency), are used not only as an alternative means of payment but also to invest, trade, lend and speculate on its value – hence 'crypto-assets'. They have been popular around the world, especially with men⁷, but also with rich investors, criminals, and tax dodgers. However, their use

and value, and that of the related crypto-industry, has fluctuated heavily and was severely impacted in 2022 ([as explained here](#)).

Conquest by big tech

'Big tech' companies are important players in the fintech world. They are the largest multinational corporations that use innovative and advanced technology, operate digital platforms infrastructure, and collect online data. They typically have a large customer base and extensive private databases that they use to derive income from advertising and grow new services. Dominant big techs that have entered the fintech market include those operating online search engines and advertising (Alphabet owning Google), social media platforms (Meta owning Facebook and Instagram, Tencent), e-commerce platforms (Alibaba, Amazon), and mobile devices and network operators (Apple, Microsoft).

Big techs that offer digital payment and other financial services combine and leverage their data gathering, technology and digital infrastructure, and customer base from their various businesses. Fintech payments started in China⁸ where Alipay on Alibaba's e-commerce platform evolved into the financial affiliate Ant Group that now provides the world's largest diverse digital financial services. Tencent's 'everything app'⁹, WeChat, includes fintech applications for mobile payments, insurance, and asset management.

Several US big techs have been catching up¹⁰. They first partnered with big banks or credit card and fintech companies to digitally offer **payment and other banking services** such as digital wallets, current and savings accounts, cash-to-card services, credit cards, and short-term loans. Examples are Apple Pay, Apple Cash (for peer-to-

peer payments), and Apple Card (only on Apple devices), with an e-wallet app pre-installed on every iPhone¹¹; Google Pay and Google Mastercard tokenized cards for limited payments¹²; Amazon Pay and an Amazon buy-now-pay-later scheme¹³; and Meta Pay, which offers to keep accounts secure with a PIN, fingerprint, or face ID¹⁴ and owns Facebook's patent to apply credit assessment based on the credit ratings of someone's friends on a social platform.¹⁵

Moving on, several big techs now operate digital banking and financial services independently, having acquired fintechs and a banking or e-money licence (e.g., Google and Meta in the EU). For instance, Apple Pay Later service provides short-term loans handled in-house via Apple Financing LLC and no longer by Goldman Sachs.¹⁶

Big tech is also active in the **insurance sector**. For instance, Amazon Protect insures customers' Amazon purchases.¹⁷ Amazon expanded to other insurance products by partnering with insurance companies and by launching a UK home insurance comparison website (Amazon Insurance Store) providing easy access to the three partnering insurers.¹⁸

Some big techs are involved in what fintech firms also do: providing **cloud computing and other cloud services** to banks and other financial providers such as insurance companies and institutional investors or even a stock exchange¹⁹ and small fintechs. This market is dominated by Amazon Web Services (AWS), Microsoft's Azure, and Google Cloud.²⁰

Big tech combines and processes data from across its ever-extending businesses, even if the fintech applications are run by a separate subsidiary of the corporate structure.²¹ Amazon Lending, for



example, uses data from sellers, customers, and sales on its retail platform to assess the credit worthiness ('credit scoring') of customers or merchants on its global platform, and swiftly provide them with small short-term loans.²² In Asia, Grab and Gojek provide financial services beyond payments within their ride-hailing platforms and through their super-apps, linking them with activities such as deliveries, ride sharing, and advertising.²³

Big finance's fight-back

In order to maintain its efficiency, market share and profitability in financial services, the traditional finance industry has had to catch up and now competes with fintechs and big tech. Especially 'big finance' players – large banks, credit card and insurance companies, and commercial institutional investors – have embraced digitalisation in different ways as the following examples illustrate.

Big finance has engaged in many cooperation agreements to provide the back office and regulatory compliance for fintechs' and big techs' new digital financial services and fintech applications. In addition, the finance industry tries to compete and bought up fintech start-ups to incorporate them in its operations and provide new digital services or apply fintech tools.

Examples of fintech by the **banking** sector range from mobile payment and short-term lending apps to the use of blockchain technology for complex multi-party financial transactions.²⁴ Some banks also use information from customers, after their consent ('open banking'), to provide analysis of their spending or saving, and to offer additional fintech products.

The **insurance** sector increasingly introduces digitalised processes and devices that interact with and track in real-time behaviour of customers, by their cars and in their houses, in order to develop profitable insurance products ('insurtech'). An interesting example is how Generali, a large global insurance company, invites customers to install its MyDrive app, which gives discounts on car insurance premiums to customers who drive more safely. The app also provides tips for "environmentally friendly" driving.²⁵

Digital technologies are also gradually transforming the **pension** industry, including more engagement with pension beneficiaries.²⁶

The **investment** industry incorporates fintech applications, for instance through 'robo-advice' on their website. Here, customers have to respond to an online survey based on which they automatically receive advice about which investment products are on offer to choose from, or the software automatically makes and manages investments for customers. Major asset managers run their own online and fintech trading and investment platforms. An example is BlackRock's trading platform Aladdin, whose sophisticated software and large database identify risks and manage "at least 10% of the world's traded stocks and bonds".²⁷ Fintech companies and crypto-assets have been an opportunity for venture capitalists to invest in crypto-firms, for hedge funds to bet on crypto-currencies²⁸, and for global asset managers to create various crypto investment funds and related fintech indexes.²⁹ Major investment banks, including J.P. Morgan and Standard Chartered, have launched their own crypto-brokerage and -exchange platforms, and introduced blockchain trading technology.³⁰

Fintech's red flags

02

*“(T)he history of financial innovation is littered with examples that led to early booms, growing unintended consequences, and eventual busts”*³¹,
Mark Carney in 2017,
then Governor of the Bank of England.

With **the rise of fintech**, the hazards, risks, negative impacts and abuses linked to its technology and use by various actors have increasingly been identified. This chapter describes these **risks and impacts** as **‘red flags’** to which civil society, academics, financial authorities and policy makers need to **pay greater attention**, as well as the whole of the fintech industry itself. It explains the ‘red flags’ with a few examples, and summarises them in the titles and conclusions of each section.

1. more financial inclusion and exclusion?

Fintech applications are often praised and officially supported as a way to increase ‘financial inclusion’, i.e. provide access to financial services for people currently unserved by the profit focused finance industry, particularly payment services for the poorest in society and those most discriminated against, including women, youth, people in rural areas or the informal economy, migrants and refugees. But for many individuals, the benefits of easy access to payments and other financial services by all kinds of fintech applications can be ambiguous at best.

The cost of fintech access to banking services

Some mobile phone payment apps, banking apps, and digital money transfer systems have improved access to banking services by making them significantly cheaper, safer, easier to use and faster. However, not all digitalisation of so-called financial inclusion instruments has been beneficial for its users. Some fintech applications in microfinance to the poorest, for example, still come with predatory interest rates, fees or practices.³² In addition, they made it easier for people and informal entrepreneurs to take on (multiple) small loans without adequate creditworthiness assessments, leading to high debt burdens.³³ Since these digital micro-loans were often funding competing businesses in the same location, the economic downturn following the Covid-19 pandemic burdened even more informal businesses with high repayment costs.³⁴ Another example of easy online funding has been through fintech crowdfunding companies using algorithms, which has left

some start-ups with heavy debt repayment burdens.³⁵

The easy access to fintech apps offering free payment services and short-term loans, especially related to e-commerce, has multiplied their use and dependence. In order to make a profit, these numerous fintech applications impose fees and costs on e-commerce merchants,³⁶ which are passed on to consumers by increasing prices or enticing people to buy more (online).

While the worldwide use of accessible fintech applications is dominated by payment and short-term automated or semi-automated loan arrangements, they also include easy-access to insurance products, stock market trading or investment in cryptocurrencies. These fintech services expand the use of e-identification systems and the need to securely store personal data to avoid misuse. They create dependency on e-identification and up-to-date mobile devices to access finance. This is expanding to the public sector. For instance, the Indian government’s welfare payments depend on such e-ID systems, which have raised concerns about privacy protection and exclusion of those without an online mobile device.³⁷

Fintech has also come at the cost of new abusive practices, fraud and crime, as described in section No. 2.

Exclusion persists and new forms are emerging

Popular commercial or government policies towards a cashless or ‘cash-lite’ society and digital financial inclusion, dominated by fintech payment and banking applications, have been promoted by

government agencies as well as finance and fintech players eager for more data and fees.³⁸ In order to save costs and provide faster access, banks and other financial services providers are requiring more financial handlings to be done online. Many merchants prefer electronic payments or even refused cash during the Covid-19 pandemic.³⁹ Moreover, governments are stimulating cashless payments, for instance India's⁴⁰ government's exclusion of cash for some government benefits, making it inaccessible to some of the poorest people, or the Philippines' central bank⁴¹ transforming unfit cash with digital cash. However, an important part of the world's population still have little or no access to the internet, smartphones, or digital devices. Fintech has not resolved the lack of affordable financial services for approximately one billion women worldwide who lack mobile phones, digital skills, and means of identification.⁴² Even in developed countries a part of the population is unable to handle quickly changing technology and fintech applications, and getting excluded from banking services.⁴³

Fintech-led 'credit scoring' for access to short-term loans and buy-now-pay-later arrangements is based on processing various online buying and digital financial transaction data, and data from a person's online activity. Some big techs are acquiring intellectual property rights for credit scoring technology based on a person's

social media, or even that of their friends, which also raises many privacy issues.⁴⁴ Such credit scoring based on only online and private data provides insufficient insights in a person's credit worthiness which has led to both over-indebtedness from online buying with short-term loans based on an overly positive fintech credit score,⁴⁵ as well as unfair exclusions to fintech services.⁴⁶ In turn, credit scores data risk being integrated in new online (fintech) data processing.

Fintech applications' growing use of algorithms based on artificial intelligence and machine learning tends to replicate social and financial discrimination as well as the finance sector's malpractices. For instance, algorithms used in online crowdfunding imitate the 'herd behaviour' typical of investors by nudging people towards the most popular start-ups, which might discriminate against those from certain sectors or regions, and those with the best returns in the long term.⁴⁷ Europe's insurance and pension authority, EIOPA, reports that in 2022 "less tech savvy members being excluded from increasingly digitalised processes, [there are] concerns in relation to data protection and privacy issues and possible discriminatory underwriting practices."⁴⁸

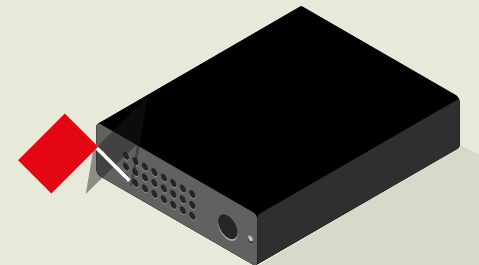
Conclusion

The expansion of numerous online, mobile and digital payment, saving and credit applications have claimed to improve access for many people excluded from the formal banking sector. However, exclusion from financial services persists or expands to those without mobile tools, digital skills or identification systems for online access. Certain fintechs have affected access to finance by discriminating based on new kinds of online data or new software that replicates existing discrimination.

The user friendly, cheap and easily accessible fintech applications have shifted their costs on merchants

and have enticed customers to spend more. Online buyers have been subject to assessment of their creditworthiness by fintech's expanded use of private and online data, resulting in inappropriate access to lending and over-indebtedness.

Some fintech applications have worsened existing problems for instance by predatory microfinance and exploitative lenders. They have enabled reaching out to more vulnerable people, trapping them in debt and exclusion.



2. citizens left unprotected against digital crime and fraud

The digital financial sector has been particularly attractive for online crime and fintech applications prone to fraud, since significant sums of money can be extracted. The unregulated status of some fintechs, and their applications, has facilitated abusive practices.

Finance a target for profitable cybercrime

Digitalisation of financial services has facilitated cybercrimes such as cyber-theft of money and crypto-assets by gaining access to bank accounts, codes, payment card data, and other personal financial information through ‘phishing’, hacking or otherwise; cyber-attacks including (distributed) denial-of-service (DDoS) attacks that make banks’ and other online financial services inaccessible; and installation of viruses and spyware via fintech applications.⁴⁹ There exists a “cryptocrime ecosystem”⁵⁰ by which crypto-currencies and services are used for money laundering,⁵¹ transactions by criminals, sanctions busting, and payment of ransom by victims whose IT systems they have blocked.⁵²

Fintech facilitates new fraud

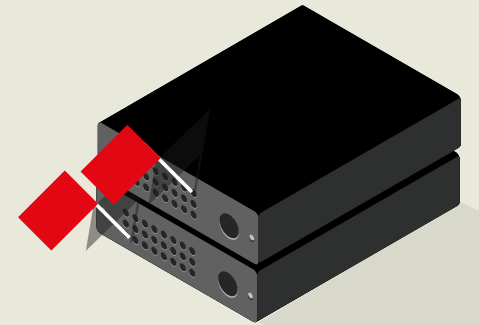
Based on fintech applications and data, fraudulent and deceptive marketing, fraudulent fintechs have all over the world aggressively and abusively ‘nudged’ (influenced) people – via mobile phone messages or through social media – to borrow beyond their means,

trade on stock markets using risky strategies and game-like features (‘gamification of investment’), buy volatile crypto-currencies with savings or borrowed money or even invest in non-existing investments. In some cases, borrowers who failed to repay to fintech lenders found themselves subject to harassment or even blackmail, having serious consequences on people’s life. Cases have been documented from Brazil, Asia and Africa where fintech lenders sent abusive messages and compromising photos to a borrower’s contacts which had to be made accessible to get the loan, or using technology to block a borrower’s phone altogether.⁵³ In 2022, fraudulent and illegal activities of various popular crypto-currency creating and servicing companies have been widely exposed with millions losing money, but many crypto-scams remain still far from being discovered, caught and penalised.⁵⁴

Circumvented regulations and taxation

Innovative fintech applications have often developed outside regulated or supervisory frameworks as they are seen as just interfaces, an unbundled finance or economic activity, or can be active online without registration.⁵⁵ Some fintech applications are designed to circumvent regulation, such as ‘taxtech’ that facilitates tax evasion and avoidance. Tax dodging and avoiding regulatory scrutiny occurs as many fintechs and crypto-companies are registered in low tax secrecy jurisdictions⁵⁶ and crypto-assets are held and stored in such jurisdictions as was the case by the now bankrupt crypto-exchange FTX.⁵⁷ This has undermined authorities’ power and financial resources to intervene and take remedial action, or prevent money laundering and criminal financing.

Conclusion



The way fintech applications have been able to develop, has increased the risk and execution of cyber-criminal attacks and new fraudulent extortions through means of online and mobile data and devices, with serious financial losses and negative impacts on people's lives. The speed of growth, the size and global

spread of abusive digital financial practices not in the least in the Global South, has made the finance system more vulnerable to fraud and crime.⁵⁸ The unregulated status of many fintechs and crypto-currencies have allowed them to avoid regulations and taxes, thus undermining government's authority and resources.

3. fintech extractivism increases inequality

While fintech innovations and new fintech companies might result in more efficiency, automation and less costs, they also offer numerous new opportunities for extracting profits from merchants and customers, and provide revenue for entrepreneurs and investors. Fintech therefore also contains risks to aggravate inequality in the following ways.

Numerous new opportunities to extract profits

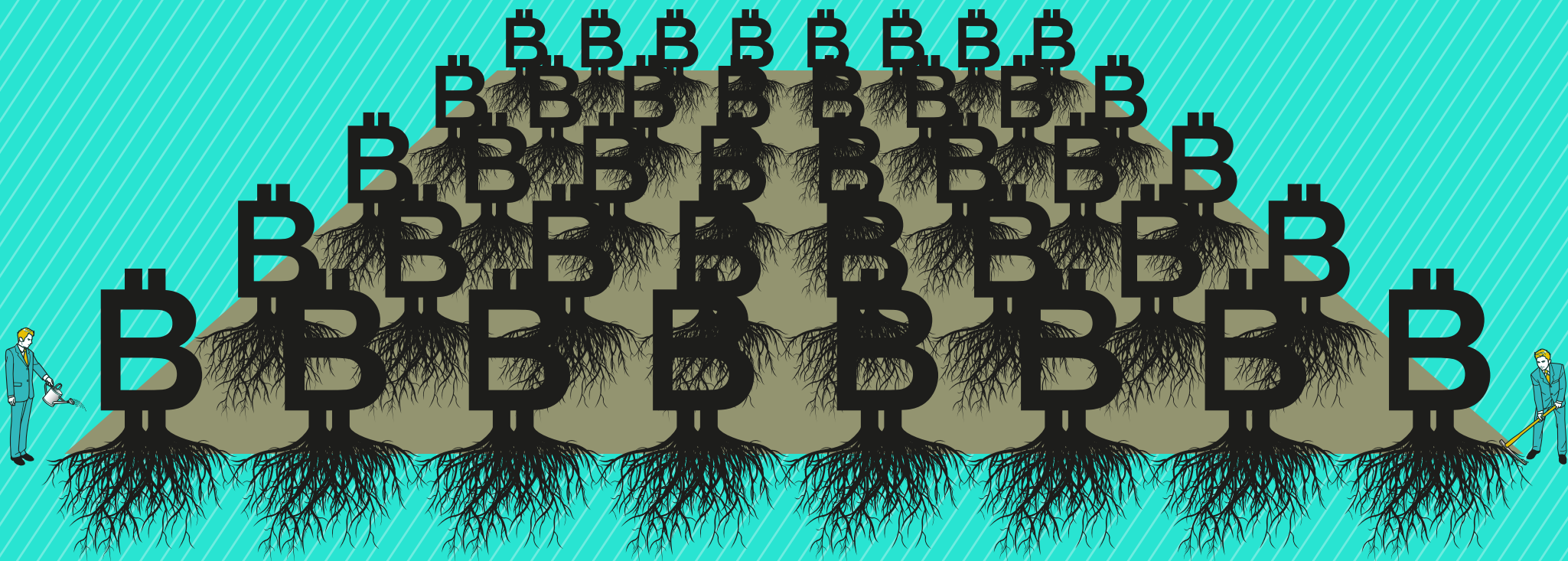
Competition to enter or dominate the mobile and digital payment market is fierce, because huge profits can be made even in low income countries. For instance, M-PESA is a phone-based money-transfer, payments, and microfinance service serving many non-banked persons and businesses in several African countries. M-PESA practiced “excessive pricing”⁵⁹ through high (hidden) fees and charges for digital services such as accessing cash from mobile apps and the predominantly tiny transactions by its poorest customers.⁶⁰ Even after authorities intervened, M-PESA’s owner Safaricom (Kenya) continued to make substantial annual profits. Safaricom’s net profit amounted to \$ 620 million in 2018–2019 and rose to a record \$ 747 million in 2019–2020, which left the country by being paid out for a large part to its mostly foreign shareholders.⁶¹ Safaricom’s major shareholder, Vodafone, reported that it used these dividends to finance its UK infrastructure.⁶² M-PESA was a first mover and is an attractive model for often foreign fintech investors as it proves that payment and banking applications via mobile phones in poor countries can impose highly profitable fees on low-income customers.

Payments and transactions worldwide total an estimated \$ 240 trillion per year (2021),⁶³ of which much is not yet digital or via cards. This gives online and digital payment providers opportunities to impose new multiple or high fees to be paid by merchants and customers in growing areas such as e-commerce (estimated to become a \$ 8 trillion market by 2023),⁶⁴ e-food delivery, online events and e-ticketing, use of e-wallets that do not pass card numbers to the merchant,⁶⁵ crowdfunding, gaming, subscription streaming, new tools for global remittance transfers (estimated to cover ca. \$ 700bn a year)⁶⁶ and other cross-border payments, contactless payment, person-to-person (P2P) and business-to-business (B2B) payment applications, and real-time payments.

The crypto-world also generates various fees since people buying crypto-currencies result in remuneration for those creating new cryptos (‘mining’, ‘farming’) and for running the server centres. Fees are also paid by clients for trading, storing, exchanging, and borrowing crypto-assets.⁶⁷ Even expensive rehabilitation centres have popped up to treat crypto addiction by people who lost large sums and want to return to a healthier lifestyle.⁶⁸

Easy fintech loans can aggravate indebtedness and poverty

As explained above, fintech applications have been used to continue predatory micro-finance, introduce controversial online credit scoring, and made it easier to nudge people to lend beyond their means, increasing over-indebtedness including amongst the poorest population. In addition, with the growth of e-commerce during the Covid-19 pandemic and more families struggling from the lockdown



impacts, buy-now-pay-later (BNPL) applications have expanded, potentially replacing the use of more expensive credit cards.⁶⁹ This loan method linked to online buying grew by an estimated 292% between 2018 and 2020,⁷⁰ and was used by millions of customers. In the meantime, BNPL providers attracted an estimated \$ 11bn in venture capital in 2021.⁷¹

The mostly unregulated BNPL fintech model to provide easy access to online credit with few or no creditworthiness checks has especially attracted younger and poorer customers in spending more online.⁷² BNPL loans have even been taken out for daily needs, impulse purchases, or from several providers at the same time.⁷³ This has created more debt than people can repay, missed instalments and ever-more costly repayments,⁷⁴ i.e. a debt spiral that further impoverishes poor and young borrowers.⁷⁵ The rising costs of living and interest rates in 2022 have intensified the struggle of the poorest borrowers to repay BNPL providers, as cases are increasingly being reported.⁷⁶

More data gathering to extract more revenue and profit

Fintech contributes to additional data gathering from online payments and other financial service provisions to be exploited for nudging customers to buy additional paid-for financial services and products. By combining these financial data with data from their platforms, their own databases, and with people's social media, fintechs and big techs find new avenues for income generating activities such as using and selling the processed data for targeted advertising or developing new profitable business areas.

Fintech apps that facilitate trading on stock markets rapidly process data from financial markets, economic news and various other areas. They present their assessments and advice in a fun-like and exciting way, mimicking games and various social media to seduce young and inexperienced people to invest via the fintech app. The fintech then earns fees from the client or the broker to whom the trade is routed (reportedly often illegally),⁷⁷ and sometimes from interest rates from customers' loans or deposits.⁷⁸ The accessible and almost irresistible investment app can result in losses if betting does not go as advised, especially affecting the young male customers. By contrast, institutional investors have access to additional sophisticated data, such as economic forecasts, and better tools to process those data and execute profitable trading accordingly.

Unequal benefits from investments in fintech companies

Fintech has been able to swiftly develop as it has attracted various investors expecting high returns from new profitable fintech business models, as with the investment frenzy in many tech companies. Private investments into fintech companies (excluding funding from loans or issuing shares) globally increased from 2010 onwards, reaching an estimated \$ 215.1bn by 2019.⁷⁹ From 2018 to end of 2022, total private investment in non-listed fintech companies was estimated to have reached \$ 353.2bn.⁸⁰

Rich venture capitalists poured a record \$ 130bn into non-listed fintechs, start-ups and unicorns in 2021.⁸¹ Such investors usually anticipate large returns from high profits or from selling their stake with a profit in the not-too-distant future. However, when fintechs

make less profits or investors see more profitable opportunities elsewhere, investors withdraw, as was the case in 2022 when venture capital for fintechs dropped an estimated 30%⁸² to 46%⁸³.

Dependency of fintech development on volatile venture capital puts more pressure on fintech providers to remain attractive to investors by making profits from customers and merchants, or shifts fintech development towards more profitable fintech areas away from servicing poorer customers.⁸⁴

Investment banks have been serving these rich investors by providing loans and various fee-paying services to facilitate such investments.⁸⁵

Various large fintech service providers, including big tech and big finance, have their shares publicly traded on stock markets. They are under pressure to maximise value for the shareholders through short-term or future high profits from their services, or through sometimes artificial high returns and profits.⁸⁶

Fintech has been another sector from which shareholders can extract profits through payment of dividends and share buy-backs, or from rising share prices on the stock market even before a promising fintech makes profits. When profitability is being challenged or the investment and economic environment changes, as happened in 2022, the fintech sector comes under pressure to prove profitability or adapt their business models,⁸⁷ often at the expense of customers who would benefit from lower service fees, lower interest rates for loans, less data tracking and more consumer protection.

The investment industry services its more affluent clients by setting up investment funds that buy shares in, or track the market value of, fintech-providing companies.⁸⁸ Asset managers or sales managers of the fintech investment funds and the creators of related fintech indexes earn profitable fees. The more profits made or forecasted, the more share prices surge and attract new investors to the fintech funds. When looking less attractive, investors can swiftly withdraw from the fintech funds. This is putting pressure from share-holding asset managers on fintechs to maximise value for the shareholders rather than for customers or society.

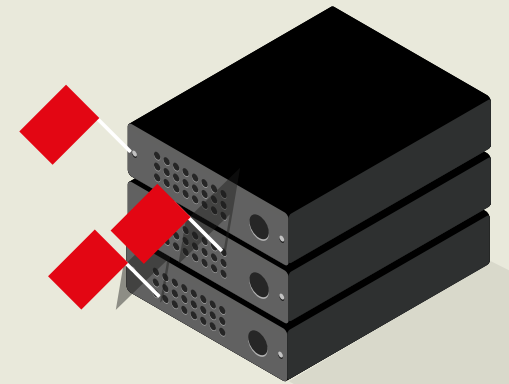
Missed income by host countries

Given that fintechs provide their services digitally and online, or without regulations, they do not always have to register in the many countries where clients easily access their fintech services, and they may escape registration requirements and related levies.⁸⁹ Various low tax jurisdictions are popular with crypto-companies,⁹⁰ and not all countries tax profits made from crypto-related investments or activities.⁹¹ Fintechs' headquarters can easily be, and often are, based in low-tax and secrecy jurisdictions.⁹² For example, some African fintechs are reportedly registered in the US low corporate tax state of Delaware.⁹³ Such corporate strategies to pay as little tax as possible increase fintech- and crypto-related companies' profitmaking at the expense of citizens and government's finances in the countries where they operate. However, some countries have introduced taxes on fintech facilitated transactions, or crypto-transactions and related profits.⁹⁴

Conclusion

Fintech is another seemingly endless opportunity to make profits out of mobile and digital financial services or by investing in new or large fintech providers. The fintech sector mimics, in fact supercharges, the extractive features of the traditional finance industry. It generates income in multiple ways from receiving fees – even high fees from the poorest people – from banking services, gathering and processing all kind of (financial) data to offer new fintech applications, managing fintech related investment products, and holding shares and betting on fintech providing companies.

Popular profitable buy-now-pay-later fintechs have been expanding alongside the more easy-to-use, fraudulent or predatory fintech tools that have increasingly indebted and impoverished especially the young and the poor struggling in times of the pandemic and rising living costs. Private investors on the other hand, withdraw from fintechs whose profitability is lost, e.g. those serving the poor, as happened in 2022. Due to corporate tax strategies, countries where fintech profits are made, are missing tax revenues and opportunities to invest the revenues in their countries. These trends risk unequal benefits from fintech's development.



4. big tech, fintech, and big finance: a toxic mix

The development and expansion of fintech has involved close cooperation as well as fierce competition between fintech companies, big tech, and big players in the finance industry. The problems and risks existing in each of these sectors become intertwined, resulting in the following new hazards and risks.

More loss of privacy from new data practices

As described above, big tech uses the operations and processes from across its businesses, and the resulting new data, to offer digital financial services. For instance, Google Pay can provide customers with analysis of their spending, savings, and upcoming bills after gaining approval to access to their accounts, email address, and Google Photos.⁹⁵

By gathering information about people's payments, receipts, loans, debts, savings, insurance, investments, buying habits and property ownership, and so on, big tech, fintech, and big finance gain deeper insights into people's financial behaviour and feed people's individual online financial profiles on which personalised advertisements and other services are based.⁹⁶ The ever-extending business areas occupied by big tech – from health to household appliances – increase opportunities to competitively target and offer financial services to customers. The combination of big tech's financial services and surveillance tracking, data processing and selling, amplifies already existing problems of loss of personal privacy, privatisation of personal data and too many third parties

accessing and using a person's online data.

Personal digital financial data are also being spread through various fintech applications without sufficient privacy protection, as illustrated by the following examples:

- A fintech app that embeds payment and lending within a non-financial company's online operations ('embedded finance') enables the company to have access to customers' payment and shopping information to target those customers with additional products or services. Without the app-using company heavily investing in cybersecurity, data protection and updating the embedding app, personal data may not be safe.
- When the finance industry acquires a fintech start-up to develop new revenue streams, the personal data gathered by the fintech start-up may move to the new owner without sufficient privacy protection.
- A robo-advice application gathers specific digital data from a potential investor without human intervention to verify the accuracy of that data based on which the (appropriate?) investment products are sold.
- Insurance companies using fintech applications can obtain sensitive digital information, such as about people's health or driving style. How such data is protected and how long it is used, is often unclear.

Risky dependence on fintech services and big tech digital infrastructure

Where fintech applications provide an interface between a bank or another financial service provider and its customers, the financial

service provider will not fully know all the digital and IT operations taking place. It risks not being able to identify or solve sudden problems in time, or control how the fintech app company uses the data. Dissatisfied customers may not know who to turn to for redress. Similarly, cloud computing and other cloud services to banks and other financial or fintech clients means that some ‘back office’ and computing activities are not based at, or fully controlled by, the client company.⁹⁷ This outsourcing creates significant regulatory and accountability issues.

Most importantly, the fintech and financial industry increasingly – from banks to stock markets,⁹⁸ aim to achieve efficiency by hiring tech firms providing digital data infrastructure and IT functions to run fintech applications and other operations. Three ‘hyperscale’ providers of cloud services – Amazon Web Services (AWS), Microsoft’s Azure, and Google Cloud – globally dominate the market.⁹⁹ This global dependence on a few US based digital infrastructure providers is risky because an outage can disrupt the transactions and even the economy of a whole country. With major UK banks using these same few cloud providers, UK financial regulators have identified a concentration risk and received a mandate to inspect cloud providers’ data centres.¹⁰⁰

Internal big tech glitches can spill over

An additional operational risk is that while digital financial services might operate from separated subsidiaries within a complex big tech corporate structure, in practice data gathering, data storage, cloud services and AI processing are interconnected throughout the company.¹⁰¹ So, glitches or hacking in one part of the big tech

business can spill over to the financial services subsidiaries and to its fintech and financial partners and customers. This risky operational intra- and interconnectedness can result in unexpected and difficult to solve hazards in the financial system.

Fintech becoming too complex to manage?

Complex fintech applications and strategies can result in unexpected risks and disruptions and serious financial losses. Fintech applications increasingly use artificial intelligence (AI) and machine learning (ML). The problem with AI and ML is that mistakes or even discrimination can be difficult to detect (‘black box’), remedied, or reversed. For instance, today’s stock market trading is heavily automated and reliant on AI/ML for a widening range of data processing. AI/ML mistakes, or AI/ML-led computers competing against each other, can cause unexpected market turmoil and financial instability, affecting the functioning and governance of the financial system. Moreover, big techs that provide fintech services have substantial financial assets which may affect, or be affected by, the financial markets.¹⁰²

Fintech borderless operations difficult to track down

Many fintech companies operate online and use digital technologies across borders, have often no particular physical address, or are registered in secrecy jurisdictions. This makes it difficult for authorities and customers to track them down when they engage in financial malpractice or in case of technical difficulties with cross-border spill-overs. The opaque financial dependencies between crypto-exchanges, crypto-investors, and crypto-lending firms resulted in unexpected spill-overs in the crypto-world in 2022.¹⁰³

Given the global interconnectedness of the finance industry and financial markets, and increasing links with fintech applications, risks and financial instability can easily spread around the financial system.¹⁰⁴

Boom and bust in crypto-world

Crypto-assets and interlinked crypto-companies were highly valued in 2021 after they had been touted, by influencers amongst others, for their robust blockchain technology and independence. The huge volatility in the value of crypto-currencies, and the rapid crash of many digital coins and related crypto-intermediaries in 2022, exposed how unregulated crypto-assets and businesses are very risky and their claims unwarranted.¹⁰⁵ Since crypto-assets had been increasingly popular, accepted and integrated in some traditional financial services, huge losses have affected many around the world, amongst others due to the 70% fall in value of Bitcoin between November 2021 and mid-December 2022.¹⁰⁶

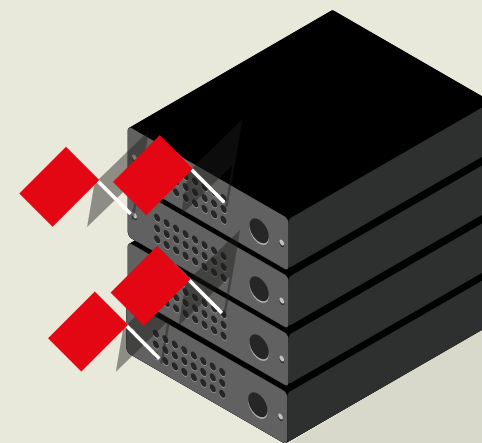
While keeping the crypto-world unregulated, the boom of crypto-currencies and blockchain technologies challenged financial authorities and central banks to start developing, creating or even launching central bank digital currencies (CBDCs) as digital equivalents of cash.¹⁰⁷ CBDCs aim at maintaining central bank power and control over monetary policy, by avoiding digital money only being created by private banks or crypto-companies and fully dominating the expanding fintech eco-system. It remains to be seen in how far the bust of the crypto-world will affect CBDCs' development ([see also below](#)).

Fully digitalised financial services bring on risky competition

Fintech technology enabled the growth of fully digital banks, insurance companies, online brokers, and so on, diversifying and competing with the incumbent financial industry. These digital financial services providers have less costs than their counterparts with physical branches and in person contacts with clients. Incumbent finance providers have resorted to cost cutting by closing many physically provided services, to the disadvantage of older and less digitally confident customers. They may also resort to more questionable strategies to maintain profitability. For instance, ING Bank in the Netherlands wanted to offer advertisements based on clients' transactions, replicating big tech profit models; ING's customers vehemently opposed this.¹⁰⁸

Meanwhile the new fully digital fintech players may use complex and less easily detectable abusive or illegal practices, such as hidden inducements, to rapidly gain competitive advantage.¹⁰⁹ This again harms the integrity of the finance system and its many users, and makes it more vulnerable to instability.

Conclusion



Fintech cooperation among big tech, fintech and big finance companies saw new risks arise from the growing connectedness and interdependence within and among them. This leads to situations where malfunctioning and glitches at one player in the fintech chain affect the others. In 2022, the crypto-world saw how its strong interconnectedness resulted in a serious meltdown, with some people making huge losses.

Harmful impacts result from blurring sectoral and country boundaries, and combining data spanning the whole of a big tech company that offers fintech services, resulting in even more data gathering and processing with too little privacy guarantees.

Increasing complexities and dependencies by integrating software and technology such as artificial intelligence, blockchain and cloud services, make fintech ever more difficult to manage. It results in a lack of capacity to swiftly detect or remediate the problems, and diffuses the needed accountability. Competition for market share and profits between fully digitalised banks or other financial services providers, and their brick-and-mortar counterparts also encourage questionable practices at the disadvantage of some customers. As a consequence of these practices and trends, the integrity and the governance of the finance system are at stake.

5. growing concentration and dependency: becoming too big to fail?

Strategies and pressures by competing fintech suppliers to maintain competitiveness or to dominate the market are creating market dynamics that affect consumers, fintech innovations, and potentially public services and budgets, as follows.

Growing horizontal and vertical concentration

Big tech has been accelerating its expansion into digital banking and other financial services (see above intro about big tech), pushing up competition pressure in the fintech market.¹¹⁰ Big tech companies like Meta, for instance, prefer to buy competitors rather than compete.¹¹¹ For a long time, fintech providers had access to cheap capital. Indeed, many fintech related mergers and acquisitions are taking place.¹¹²

Since big tech and big finance¹¹³ already dominate many markets and have huge financial resources, they can quickly enter a new fintech market and dominate as well. Innovative or big fintechs can also enter a new country and easily outcompete smaller rivals or dominate that new market. These competition dynamics result in growing horizontal and vertical concentration in national and international fintech markets, or in particular fintech segments.¹¹⁴ This could influence how fintech start-ups and the whole financial services will operate. It would also increase dependency of countries, especially in the global South, on a few foreign firms for their financial operations.

Big tech prioritising own products and ecosystem

To gain competitive advantage, big tech companies exploit their extensive data bases and advanced technology, which are usually greater than that of the competing fintech and big finance industry.¹¹⁵ Big techs that operate financial services through independent licensed subsidiaries use their platforms, whether for e-commerce, web searching, or other operations, to sell their own fintech services and may prioritise them on their platforms. Apple has also prioritised its own payment applications on its own devices.¹¹⁶ In this way, big techs seek to benefit from ‘network effects’ whereby they become more useful to customers as they grow and diversify, which also makes their fintech services more attractive to new prospective customers.¹¹⁷ Once consumers and businesses, or even workers, are attracted for specific fintech products or services, big tech strategies attempt to lock them into their comprehensive closed digital ecosystems. This makes a big tech company raise its revenue and expand even further, in turn growing horizontal and vertical concentration in various areas.

Concentrated fintech markets support abusive market power

Customers may in the short-term benefit from fintech innovations offered by a few dominant big tech, fintech or financial companies. In the long term, such developments may lead to the dominant fintech-related players abusing their market power, preventing customers to leave their ecosystems, raising prices for fintech services, and reducing innovation and quality. Multi-sector companies that trap consumers or merchants, and their finances, within their ecosystem, and in addition use their own crypto-

currencies, could fully bypass official currencies or publicly available financial systems and leave consumers unprotected from the value fluctuations of crypto-currencies.

Countering market power abuse by dominant fintech players towards customers and suppliers can be challenging given the rapid developments. Competition policy makers cannot fully rely on existing market competition theories or laws.¹¹⁸ Online, often cross-border, complex fintech applications might allow predatory behaviour to continue. Even if they are litigated in court, fined or threatened by new laws and regulations, dominant big fintech players may be well-resourced and -connected to lobby, defend their interests and avoid sanctions.

Public infrastructure is scarce to counter foreign infrastructure dependency

Big tech's continued consolidation means that a growing number of digital financial services depend on its digital infrastructure, especially the three cloud 'hyperscale' providers (AWS, Azure and Google Cloud). Importantly, for quite a few countries this means dependency on a limited number of foreign owned fintechs and digital payment infrastructure providers, which they can hardly influence to promote the payment system their citizens need. This foreign dependency, especially by the Global South, with revenue and profits accruing abroad, has to be considered a new form of "colonial-style extractivist" model according to some analysts.¹¹⁹

Very few public authorities have developed a state-run basic digital payment infrastructure to avoid such dependency. The Indian

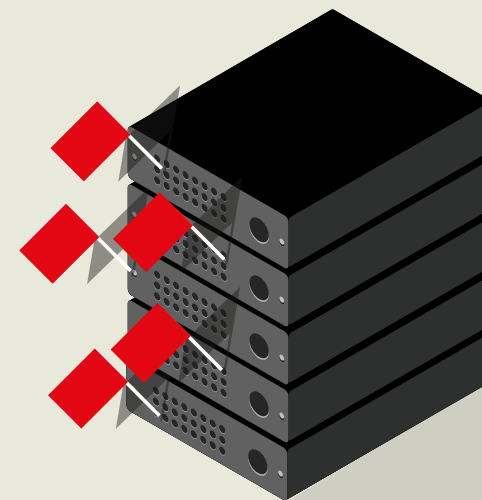
unified payments interface (UPI) is run by the not-for-profit National Payments Corporation of India (NPCI) and regulated by the country's central bank, to be used by people for cashless costless payments.¹²⁰ Still, commercial fintech applications run on UPI and can take dominant positions if no competition authority intervenes.¹²¹ A fully publicly run payment system is Pix, an instant payment system created, owned and run by the Central Bank of Brazil and integrated in the app of approximately 880 payment providers.¹²² It is used by 127 million Brazilians who can so avoid using expensive payment cards.¹²³

Will public money need to bail out dominant fintech or digital payment infrastructure providers?

The rapid digitalisation of financial services and growing use of a few state-of-the-art digital payment infrastructures, makes the latter increasingly indispensable. However, the complex structure, private ownership and financing or shareholding by private investors who expect high profits, makes the operational survival of these private payment infrastructure providers vulnerable. The rapid fintech innovations often lie outside regulatory scrutiny, and the operational, data and financial interconnectedness can make mistakes, glitches or cybercrimes in the fintech eco-system swiftly cascade through the financial system. In case of heavy financial losses, market turmoil or bankruptcy, state authorities may be left with little choice but to bail out large fintech providers or financiers to protect the fintech ecosystem and financial system as a whole. Something similar occurred with risky financial innovations that led to the financial crisis in 2007-2009.

Conclusion

Pressures to maintain competitiveness due to big techs' combined use of its databases, technologies, software and ecosystem to provide fintech services has fostered horizontal and vertical consolidation in national and international fintech markets. Once dominant, fintech or infrastructure providers may abuse their market power and network effects to lock in consumers and merchants. The rapid digitalisation of financial services is increasingly dependent on a few state-of-the-art, often foreign, fintech providers and digital payment infrastructures, which are hardly countered by public run digital payment infrastructures. Moreover, large and dominant fintechs have ample resources to protect and defend their interests. By becoming so important, big fintech or digital infrastructure providers, or their financiers, may need to be bailed out with public money in case they face financial turmoil or bankruptcy.



6. complex challenges ahead

The fintech industry will continue to develop and deliver more innovations. This is likely to come with future disruptions and hazards, some of which are the following:¹²⁴

- **Hyper-automation based on AI, ML and larger data sets:** The swift developments in artificial intelligence and machine learning, supported by new powerful quantum computers,¹²⁵ will increasingly combine an ever-wider range of financial and non-financial data, algorithms, natural language processing, facial recognition, cloud computing,¹²⁶ and other technical tools. This will facilitate the hyper-automation of financial operations, analysis, advice, and decisions in lending, trading and investing, allowing the volume the financial sector can process to grow and make more profits, but challenge business models.¹²⁷ It will also accelerate the corporate monopolisation of algorithms and AI/ML technologies and companies,¹²⁸ and of the cloud industry that AI/ML companies use.¹²⁹ The finance and fintech sectors might not be able to catch up with these developments¹³⁰ and authorities may not be able to regulate in time.
- **Increased outsourcing further diminishes in-house controls:** The use of complex cloud computing, based on innovative data interconnections or processing and IT operations, and other forms of outsourcing and partnering, will intensify. This is likely to result in the finance industry and even small fintechs further losing in-house knowledge and control over their digitalised operations.¹³¹
- **More customer behaviour surveillance:** Continued monitoring or surveillance of customer behaviour through multiplying online and fintech applications, data gathering that includes personal financial data from sensors and data interconnections, presents mounting risks to personal privacy.
- **Disruptions by new no-code or low-code applications:** New applications and developments using no-code or low-code and open source software could disrupt the fintech market and allow more diversification among fintech players. This could be a socially beneficial development but may also lead to risky counter strategies from the dominant players to protect their exclusive technology and data.
- **Central bank digital currencies face various challenges:** The plans by many central banks to introduce digital currencies (CBDC) to stave off the challenge to monetary policy by crypto-currencies and the commercial digitalised fintech ecosystem, will continue to be debated. CBDCs for citizens' use will need to gain public trust and public guarantees regarding privacy through no-tracing, data and programming integrity, no control over its use, and independence from big tech (infrastructure) or commercial intermediaries. Many other problems raised, e.g., about utility, costs, commercial uses, regulation, supervision, and impact on the financial sector, will

Everyone doing just their small part within a wide-spread fintech chain, may mean no one will be really responsible and accountable for negative effects on a sensitive and important sector like finance.

need to be solved, including cross-border interoperability¹³² and how CBDCs will operate many decades ahead.

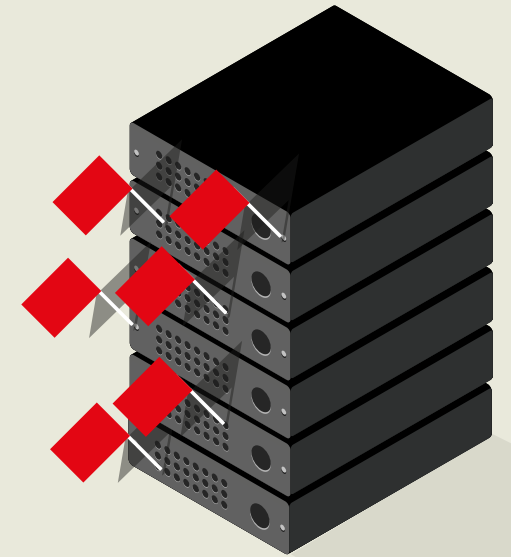
- **Blockchain dependency¹³³ and vulnerabilities:** Blockchain and distributed ledger technology will be increasingly used (often related Web3 or decentralized finance (DeFi)),¹³⁴ including for complex financial transactions in various financial services sectors, crypto-asset applications, non-fungible tokens (NFTs) and related payments, which will lead to more blockchain dependency. The resulting expanding use of energy – fossil fuel based or renewable – potentially limits its expansion and survival. High energy prices, reduced availability of electricity and cooling water, unfavourable conditions in host countries, and costly crypto-generation and -verification remunerated by lowly valued or volatile crypto-currencies, have made crypto-mining unprofitable. In 2022, some crypto-companies went bankrupt, exposing the threat to the continuation of digital assets.¹³⁵
- **Payments in the metaverse:** Payment for and investment in assets in the metaverse, have to date involved billions of dollars spent on virtual land and houses, and so on. Payments are done by existing and crypto-currencies. Various big finance institutions experiment in the metaverse on how to benefit from the expected huge transactions.¹³⁶ Yet the metaverse is so far not fully operational and its future is uncertain.
- **Geopolitics threaten cyber security:** Geopolitical tensions already lead to the need to choose digital financial applications or infrastructure exclusively from either within the US or the China

sphere. Cyber-attacks, hacking and cutting off digital transmissions and infrastructure may occur as acts of state competition or war.¹³⁷ Crypto-currency hacking and theft by states facilitate buying destructive software or hardware, including nuclear weapons as was the case by North Korea stealing up to \$ 1.7bn in 2022 alone.¹³⁸

- **Difficult economic environment threatens survival of fintechs:** The rising living costs, macro-economic and financing tightening, and diminished online activities after the Covid-19 pandemic, are reducing the use or profitability of fintech applications since mid-2022. The resulting lack of attractiveness and income by fintech are affecting the revenues of, investments in, and sometimes the survival of, particular fintechs.¹³⁹ In turn, if a few big fintech providers survive and dominate, that might have macro-economic, financial system and governance implications.

Conclusion

Fintech innovations are far from over. They are evolving through the intensified use of artificial intelligence and machine learning, automation, outsourcing operations in the cloud, open software, blockchain and distributed ledger technology, payments in the Metaverse, and official or commercial digital currencies. Fintech's expansion and safety will be impacted by geopolitical tensions and adverse macro-economic conditions. These future, sometimes self-reinforcing, dynamics will influence the online and digitalised financial services industry, big tech and the financial system. These new trends will add to the already existing challenges and complex problems of the fintech industry.



7. policy makers, regulators and supervisors: too little too late

Governments, policy makers, legislators, financial regulatory and supervisory authorities have been late to address risks, harms and challenges that arise from the digitalisation, platformisation and datafication of financial services. They have assumed that the introduction of new technologies and new players would improve the range and quality of financial services and reduce the market dominance of big finance. They have often taken a linear view of fintech developments – how fintech simply expands and develops further what currently exists, and not a structural view – of how fintech is poised to fundamentally transform the finance sector and many related sectors, including the role of various private and public actors in it.

Because of emerging evidence of harms, risks, and challenges associated with fintech, several international and national authorities have undertaken research, consultations, and supervised ‘sandbox’ experiments. Some have proposed or introduced new laws, regulations and supervisory approaches.¹⁴⁰ Nevertheless, overall effective structuring of fintech’s governance and regulatory innovation is missing, as explained in this section.

Regulators’ approach is a hesitant balancing act

Due to their reluctance to stifle innovation and new business developments, financial authorities have hesitated to swiftly regulate

or take a precautionary approach. Their prevailing attitude towards fintech regulation is to balance between consumer protection and support for innovation, operational resilience and stimulating competition, financial system stability and tolerating unregulated activities. This has delayed a proactive and holistic approach. The EU for instance, has a series of laws that stimulate and regulate fintech to support likely benefits while addressing specific problems.

Gradually, financial regulators take the approach of ‘same activity, same risk, same regulation’ and be ‘technological neutral’, i.e. applying financial regulation regardless of the technology used to deliver financial services.¹⁴¹ However, this may underestimate the quantitative shifts in risks from the technologies used, and the cross-sectoral consequences from the involvement by big tech, as compared to non-digital finance.

Too complex to swiftly regulate and supervise

The mixed nature of many fintech applications whereby big tech, fintech, financial and/or commercial companies cooperate, result in financial authorities not having a mandate to intervene in the whole chain of actors. This is especially problematic because big tech is involved in vast areas of fintech activities. Coordination is lacking among legislators, regulators and supervisors responsible for data privacy, cyber-security, anti-money-laundering, banking, insurance, investment, technological infrastructure, consumer protection, competition policy, communication, advertising, intellectual property, labour protection, and international trade and investment agreements.

Although authorities recognise the need for such cooperation, little has so far been achieved. A new and adapted governance and legislative framework that covers the many areas affected by fintech related business models, requires a long and complex process for which governments and authorities currently seem to lack appetite or capacity.

Lack of cross-border cooperation to avert financial instability

As mentioned, fintech's cross-border data transfer, distributed ledger technology and online access to various jurisdictions make it difficult for national authorities to tackle some illegal online operations in their country.¹⁴² Cross-border cooperation between major home and host countries' financial authorities does exist, such as for internationally operating banks, but is limited regarding fintech. Without enhanced cross-border cross-sectoral cooperation, fintech's customers and merchants, and the interconnected financial world remain unprotected from malfunctioning and instability.

Digital crime addressed too slowly

Financial and other authorities have not had sufficient capacity, nor the mandate, to protect consumers against the many criminal and fraudulent fintech practices mentioned earlier, and to prevent cross-border cyber-crime and crypto-crime. Only lately have authorities focused sanctioning the crypto-world's role in money laundering, criminals' finance and sanctions evasion.¹⁴³

Some authorities have been tackling problems of illegal and misleading marketing by improving citizens' financial and digital

literacy, monitoring social media and issuing warnings via social media, and imposing fines. However, authorities in many countries do not have the capacity to implement such measures, which, in any case, are not sufficient.

Interdependent corporate structures 'a key blind spot'¹⁴⁴ in regulation

Big tech companies that interconnect their data and infrastructure throughout their complex corporate structures to provide digital financial services, cloud and/or digital infrastructure services are insufficiently regulated to ensure they can repay customers in case of bankruptcy or technical problems – and avoid a public bail out. Regulatory proposals to tackle the full problem are only emerging of late, such as: segregating big tech units offering licensed fintech applications from the rest of the big tech company, better regulating the overarching governance of a big tech company, distributing data across several on-site servers and clouds that are subject to supervision in order to decrease cyber risk, and developing public digital finance infrastructure and applications.¹⁴⁵ As long as the fintech related internal and external corporate interdependencies are not effectively regulated or resolved, the financial system is vulnerable to systemic disruptions.

Fintech related concentration insufficiently tackled by competition policy and public alternatives

The new challenges of today's concentration of large digital infrastructure by AWS, Azure or Google Cloud, fintech-related mergers and acquisitions, and the growing capacity by some players to dominate a fintech or crypto-market or segment, have not

sufficiently been met by competition authorities. The latter need the capacity and political will to not over-favour innovation that often turns out to become extractive or manipulative, at the expense of consumer/citizen protection and financial stability.¹⁴⁶ By cooperating more with financial and other authorities, competition authorities could better detect market power abuse and decisively intervene. Also, new legislation may be required to proactively prevent market concentration, for instance by improving mandates to block mergers or acquisitions that would be too difficult to dismantle afterwards. Concentration in the financial sector may continue as small financial cooperatives cannot compete with the attractive fintech applications of the bigger, mostly global, financial players.

There seems to be too little political will in many countries to counter corporate fintech concentration and dependency with public digital payment infrastructure that comes with appropriate user protection, financial inclusion and resources for maintenance and improvement.

Unregulated risky crypto-world finally tackled

In 2022, the huge fall in the value of crypto-assets and the bankruptcies of various crypto-related services (issuers, exchanges, custodians, lenders, hedge funds) exposed how the crypto-world is both interconnected and connected with the traditional financial system, and how its unregulated status made millions around the world lose their savings.¹⁴⁷ In February 2022, the international Financial Stability Board (FSB) had stated that crypto-currencies and stablecoins are a threat to stability of the financial system because of their price volatility, trading applications, speculation by highly

interconnected institutional investors, cyber-theft and attacks, and criminal payments.¹⁴⁸ Nevertheless, financial authorities failed to swiftly regulate or ban the expanding crypto-industry. At the end of 2022, after many scandals, bankruptcies and loss of millions of citizens' savings, the FSB and many financial authorities called for urgent regulation of crypto-intermediaries while failing to prohibit harmful activities outright.¹⁴⁹ Nevertheless, the regulatory progress is slow and the capacity to supervise regulations as proposed is a challenge.¹⁵⁰

Challenges for central bank digital currencies (CBDCs)

More than 60 central banks around the world are developing or have launched their own central bank digital currencies (CBDCs) to stave off the dominance of commercial money and crypto-currencies facilitated by fintech. They face many challenges that are of yet not all being addressed. A major issue is whether CBDCs can really be untraceable so that privacy is guaranteed. The European Central Bank's choice of Amazon to participate in testing the deployment of a digital Euro in e-commerce has not eased worries by citizens and legislators.¹⁵¹ Authorities still need to solve issues related to their benefits, usefulness and use, as well as regarding costs, risks, problems, technology and programming, and further dependency on market based digital infrastructure or commercial financial intermediaries. The European Banking authority has even warned it does not have the capacity to supervise the upcoming CBDCs.¹⁵²

Financial authorities seriously lack fintech expertise

Finance firms increasingly use 'regtech' software to strengthen their compliance with regulations and mandatory reporting to authorities,

again increasing their dependency on fintech and digitalisation.¹⁵³

Interestingly, financial authorities use ‘suptech’ (supervisory) software to speed up their supervision, and to provide machine-readable and machine-executable regulations to the financial services industry they supervise.¹⁵⁴ Meanwhile, they don’t have enough in-house expertise and capacity or resources to effectively supervise, regulate, and tackle abuse in, the rapidly evolving fintech and crypto-markets.¹⁵⁵ Policy makers and regulatory authorities’ desire to support fintech innovation while protecting customers, are hampering growing legislative initiatives to be strict, focused on the public interest, and be future proof. Many fintechs and crypto-companies are based in (secrecy) jurisdictions that have too little appetite or capacity to impose stringent regulation and supervision on digital banks or financial services providers. Moreover, legislating, regulating and supervising fintech comes on top of building much needed new expertise in order to urgently regulate climate risks for, and caused by, the financial sector.

Conflicts of interest undermine swift regulatory uptake

During fintech legislative processes, big tech, fintech and financial firms are heavily involved in corporate lobbying, with huge budgets, ‘revolving doors’, and powerful industry associations that can drown out public interest arguments.¹⁵⁶ In any case, civil society is hardly involved in such processes. Regulation might also be hampered by conflicts of interest that exist when politicians are financially involved with fintech, such as Kenyan politicians who owned shares in, and hugely benefit from dividends by, Safaricom, co-owner of the popular M-PESA.¹⁵⁷

Western governments see the growth of fintech companies based in their countries as a new area of economic development and support the expansion of these fintechs into the Global South. Amongst other things, they negotiate trade and investment treaties that include rules that prevent host governments from intervening in fintech’s profit-making business models. All these dynamics thwart home and host countries to govern the fintech market that influences their economies and citizens.

Conclusion



Financial policy makers, legislators, regulators, and supervisors are losing the race against swiftly evolving and complex or even criminal fintech developments. Because of their hesitancy to stifle digital innovations, they now still lack much needed policies, laws, and mandates to cooperate across borders and across many sectors so as to govern fintech's direction in a holistic way. Important blind spots remain in the regulation of intra- and inter-dependencies within and among big tech, fintech, crypto and big finance companies, and their strategies to dominate particular fintech markets. The introduction of much needed legislation might be hampered by well-funded lobbying by the fintech industry and conflicts of interests.

Many central banks are still considering issuing their own digital currencies to raise publicly backed money in the fintech sphere but many issues of trust, operation and usefulness still need to be resolved. This will put further pressure on regulators and supervisors who still seriously lack the necessary fintech and crypto expertise. Overall, it leaves fintech developments without a democratic governance to address their societal challenges.

The way forward

03.

Prioritising the public interest

Whether and how developments in fintech can benefit society and the economy will depend not only on whether the above-mentioned red flags will be addressed. Benefits will also result from integrating fundamental principles in fintech's role to address global sustainability and inequality, and to shift power to people to define their lives and their societies.

To shape fintech's future with these public interests at the forefront, decisions cannot be left only to the commercial fintech sector, or policy makers and financial authorities.

At a time that unregulated fintechs' failures have alerted regulatory authorities that action is needed, and the economic downturn confronts fintech with new challenges and risks, consumers and citizens should have an opportunity to raise their voices around the world articulating their needs and interests. The following issues could be part of research, public and political awareness raising and debates, consultations and dialogues, and ultimately decision-making.

Resolving urgent problems of the finance system

Fintech applications have been promoted to challenge the incumbent finance industry and provide better access to financial services to financially underserved people. In practice, they have also increased rather than resolved many malfunctions in the finance sector. More laws and regulations are being debated and introduced to avoid existing finance sector problems in new fintech applications while still accommodating fintech expansion, as a series of EU fintech laws illustrate.¹⁵⁸ Experiences described above have highlighted how authorities need to pay more attention to how fintech can reverse finance sector problems that undercut societies, such as overdependency on debt and too many speculative tools that lead to risky investor volatility and financial losses.

Preventing a misallocation of resources to benefit a just transition

The rapid developments and the complexity of the fintech industry have distracted the attention and resources of financial authorities away from swiftly reforming the financial system's misallocation of capital, resulting from prioritising maximum profits for investors

over benefits to other stakeholders and the financing of climate change mitigation. Whether and how CBDCs could play a role in more allocation of finance towards the Paris climate goals, requires a thorough debate and balanced assessment.

Huge amounts of private capital are allocated to the development and deployment of new fintech applications and crypto-assets, regardless whether they are socially or economically useful. Fintech enables quick access to payment and investment services with a few clicks. This is contrary to sustainable finance principles by which paying for consumption and choosing investments are carefully undertaken in order to have a positive social and environmental impact. Solutions need be introduced that stop fintech's financing of unsustainable consumption, wasteful betting and speculating, and too high indebtedness.

Fostering long term and sustainable fintech infrastructure

Fintech's expansion of digital applications, use of cloud computing and AI/ML, integration of crypto-assets and CBDCs, and other distributed ledger technologies, will raise energy consumption for decades. In a time of mounting climate change impacts and energy scarcity, the long-term feasibility of these fintech trends has to be assessed.

In addition, fintech's use of digital devices will continue to extract scarce mineral resources for hardware and batteries, with negative impacts on mining-affected communities.¹⁵⁹ This raises unanswered questions whether fintech should be allowed to expand without

limits and to compete for scarce resources and (renewable) energy.¹⁶⁰ Moreover, ever more production of unsustainably resourced mobile devices will generate highly polluting e-waste.

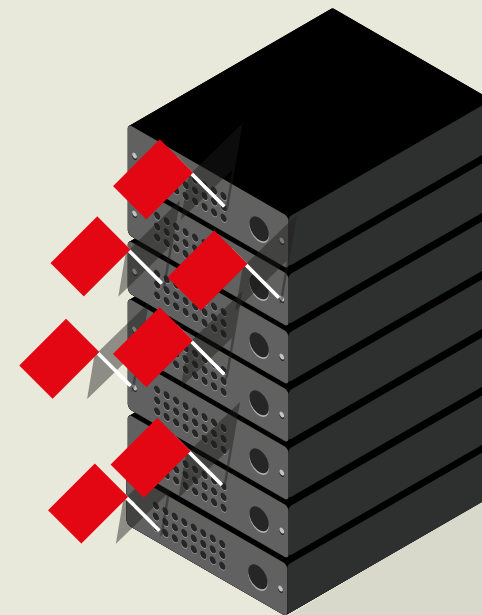
In order to facilitate fintech, the boundaries between public and private digital finance infrastructure have often been blurred. In order to assure affordable payment services for decades to come and underpin CBDCs, authorities should weigh the financial and non-financial benefits against the cost of providing public digital payment infrastructure.

Alternatives to corporate digitalisation of finance

By introducing all kinds of applications without regulatory approval and by privatising even more data from its customers, fintech's development has actually resulted in a powershift away from citizens' decision-making. It also swept away some few democratic alternatives in the financed sector, as small cooperative banks have not survived the fintech attractiveness.¹⁶¹ So far, fintech alternatives that are democratically decided and used as public services, remain under the radar. One example is a community-governed fintech programme applied in Brazil by a community bank that generates and keeps value within the community and advances its citizens interests.¹⁶² An alternative could be to promote sustainable lifestyles by providing verified data about the level of sustainability of products on sale to fintech customers free of charge, in contrast to the freely taking and using of consumers' data by the fintech industry.¹⁶³

In order to prevent 'red flags' in fintech, more fintech alternatives need to be promoted and developed by civil society, communities, independent researchers and social entrepreneurs, and be supported by regulators and fintech practitioners. Authorities that are 'balancing' different interests should evaluate of how citizens are winning or losing the power to shape their lives.

Conclusion



It is high time to raise public and political awareness of the actions urgently needed. Fintech-related risks and harmful impacts need to be addressed, while also tackling existing structural and new cross-sectoral issues. So far, rapid fintech developments have not been met with sufficient democratic scrutiny to benefit each country where fintech operates. More attention needs to be paid to how fintech applications and devices are competing with scarce energy and natural resources, and to whether fintech or crypto-assets contribute to the misallocation of financial resources.

Valuable alternatives to corporate fintech must be brought to consideration when defining policies and

regulations. Citizens, civil society organisations and independent academia ought to be more involved in decisions about halting harmful applications. They also should be involved in exploring and promoting fintech alternative developments that will serve those who need them most. Key goals of the use of fintech and (crypto?) money should ideally be to accelerate the transition to more sustainable and inclusive societies and economies by financing effective ways to tackle climate change and inequality. Some of the current combined dynamics of big tech, fintech and the finance sector, are thwarting these desired objectives.

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Glossary

AI/Artificial intelligence

Computer systems programmed to simulate human thinking and action by analysing large quantities of data to perform tasks, including in the finance sector. Generative AI is a text-generating system in response to a demand and based on existing content on the Internet; see also ML/machine learning.

Algorithm

A set of human readable instructions for computing functions towards given outcomes, such as securities trading and loan pricing.

Algorithmic decision making

Such decision-making that is exclusively or highly dependent on already set algorithms working on available data. In finance, algorithms may be used, for instance, to analyse large data sets to make decisions such as approving a payment or a loan, or even to supervise securities trading.

AML-CFT/Anti-money-laundering and combating the financing of terrorism measures

Laws, regulations, and enforcement actions to prevent, detect, investigate, or sanction movements and deposits of money that results from, or is used for financing of, crime or terrorism.

API/Application Program Interface

A set of rules and specifications that allow software programs to communicate and interact with each other, and which form an interface between different software programs. Private APIs can only be used by services that belong to the ecosystem of the owner, and are not available to competitors. Many mobile apps use APIs.

Back office

The administration and functions of a company, which is invisible to users but necessary for a company's operation, including regulatory compliance, financial administration and accounting, and the human resources department.

BaaS/Banking-as-a-service

A fintech application that enables integration of banking services into services offered by a company that does not have a banking licence; implemented by the licensed bank that requires the non-licensed company to meet the bank's compliance requirements, and often with the company directly connecting to the bank's systems via an API.

Big data

The massive volume of data generated, gathered, stored and analysed by the increasing use of digital tools, information systems and advanced analytical techniques.

Big tech or big techs

Large multinational corporations dominating in technology and digital consumer services that gather and leverage data from their large customer base; mostly referring to the following large multinationals: Alibaba, Alphabet (incl. Google), Amazon, Apple, Meta (incl. Facebook), Microsoft, and Tencent (incl. WeChat)

Blockchain

A digital ledger that holds details of transactions in the form of digital blocks of information; each new transaction is validated by adding a new block of information to the digital chain of pre-existing blocks via a computerised process, allowing each transaction to be traced, and remain indelible; see also DLT/distributed ledger technology.

Bundling

Offering multiple products together inseparably.

CBDCs/Central bank digital currencies

A new digital form of cash money backed by a central bank and issued to the general public for payment or saving; contrasts with crypto-currencies developed and handled by private players.

Cloud services

A range of IT applications and resources that include software, infrastructure, and platforms hosted by third-party providers and delivered on-demand to

companies and individual customers through the internet. Cloud services include hosting servers to store data or provide digitalised computer services without the customer having to invest in internal hardware or software expertise.

Credit scoring

A method to evaluate the probability that a potential borrower can repay a loan.

Crowdfunding

Fundraising without traditional financial intermediaries through a web-based platform that matches people with organisations, companies or with other people; crowdfunding platforms typically may not provide risk analysis or protection, but a company can offer a contract to those who lend or invest via crowdfunding.

Crypto-assets

Private digital assets that use cryptography, DLT/distributed ledger technology, and online P2P/peer-to-peer networks to create, transfer, and store value or digital rights; in finance refers to crypto-currencies, which are also stored to invest rather than to pay.

Crypto-currency

Digital currency created using blockchain technology by non-profit individuals and organisations and by for-profit companies and entrepreneurs.

Crypto-exchange

A digital platform where customers can buy, sell, or transfer crypto-assets/crypto-currencies; often provides custody services to store crypto-assets or sometimes lending options.

Cyber risk

The possibility of an attack on the IT systems of a company, organisation, individual or country, resulting in the system's operational disruption or failure, data breach, financial losses, etc.

DeFi/Decentralised finance

Alternative P2P/peer-to-peer/person-to-person financial systems, markets, services, and products that operate without traditional or regulated financial intermediaries, using crypto-assets based on secured DLT/distributed ledger or similar technology and "smart contracts" (software).

Digital asset

Anything created and stored digitally, identifiable, and discoverable that can be used to create value; some digital assets use blockchain or similar technologies.

Digital bank

A company providing banking services remotely through electronic/digital channels with no or only a very few physical branches.

Digital ecosystem

An ensemble of services, some complementary, connected to another through private APIs which are APIs accessible only to services from the same ecosystem.

Digital financial services

The range of financial services and products provided through digital/electronic/fintech technology.

Digital ID

See e-ID.

Digital payments

Payment instructions via the internet or other telecommunications networks using computerised devices and fintech software to make payment transactions.

DLT/Distributed ledger technology

A technological infrastructure using a protocol, cryptography, and network rules to securely access, validate, store, and update data in an immutable and decentralised way across multiple entities and locations. See also blockchain.

e-ID/Electronic identification or digital ID

Unique digital proof of identity for citizens, instead of a physical identity card or passport, enabling online identification, including for digital financial services and opening a banking account.

Embedded finance

Non-financial companies offering digital payment and financial products or services, often related to their non-financial products or services.

e-money/Electronic money

Money stored electronically, e.g. in banking computer systems, and used for transactions through electronic systems.

e-wallet or digital wallet

An app on a device, or an online service that enables a person or entity to make electronic payments or transactions, linked to the person's/entity's bank account or a prepay option with another party; this fintech service can be provided by a third party distinct from the provider of the underlying account.

Fiat money/currency

Government-issued currency that is legal but not backed by gold.

Financial inclusion

A situation in which all people and organisations, especially the marginalised, have access to useful, affordable, and responsible financial products and services, e.g. payments, savings, loans, and insurance.

Financial intermediary

A third party that facilitates or operates a financial transaction or financial service between different parties.

Fintech

The development and application of digital technology, new business models, and processes to create new digitalised financial products, services, and money.

Fintech company/fintechs

Refers to a company/businesses that develop and offers digital financial services.

Front end

The interface that users see when they use a software program or open a website or application.

FSB/Financial Stability Board

An international body governed by financial authorities and finance ministries from a select group of richer countries (www.fsb.org); monitors and makes recommendations about the stability and regulation of the global finance system.

Instant payments or real time payments

Electronic payments by and between people and organisations, executed instantaneously and faster than traditional bank payments.

Insurtech

Fintech applications in the insurance sector.

Interface

A digital place or space where unrelated or independent systems meet and interact or communicate with each other; or the front end of a software program or website or application visible to users.

Interoperability

Technical or legal compatibility that enables a system, e.g. a bank's payment system, to be seamlessly used with other systems.

Market capitalisation

The total market value of a company's shares listed on a stock market.

Metaverse

An online space, including as being currently developed by Meta (Facebook), where individuals and companies can communicate and act in a virtual imaginary environment that mimics the real world, including buying digital assets such as digital real estate or land.

Mining

Crypto-mining, crypto-farming or crypto-currency mining is a process of creating new digital coins, validating them, and securing their blockchains, for which successful miners receives a fee in crypto-

currencies; the complex mathematical process involved needs large amounts of computing power, which in turn requires cooling.

Microfinance

Provides financial services to low-income individuals, self-employed and small businesses, who traditionally cannot access existing banking and other financial services.

ML/Machine learning

A sub-category of AI/artificial intelligence whereby a computer program learns and adapts, with limited or no human intervention, based on finding patterns in huge quantities of data.

Mobile banking

A service that allows customers to access banking services through mobile devices, often a mobile phone.

Mobile money or mobile wallet

Storage of prepaid funds on a mobile device or phone, which can be accessed through specific payment instructions on the device or phone.

Network effects

The process by which digital platforms become more valuable the more users they have, which in turn makes them more attractive to potential new users.

NFT/Non-fungible token

A unique digital identifier that cannot be copied, substituted, or subdivided, that is recorded in a blockchain, and that is used to certify authenticity and ownership.

NBFI/Non-bank financial institution

A financial institution that does not have a (full) banking licence but provides financial services such as investment, corporate credit, and insurance.

Nudging

Encouraging and pushing someone to do something; digital fintech nudging involves sending, sometimes subtle but often aggressive, unsolicited messages asking people to buy a fee-based financial service.

Open banking

Services based on consumers and small and medium-sized enterprises consenting to share their bank and payment transaction data securely with fintech service providers, who in turn provide them with analysis and various (payment and other banking) applications and services, often employing APIs.

Open data

Data that can be freely used, reused, and redistributed, sometimes subject to a requirement to attribute; in finance, a framework in which people and organisations can choose who gains access to their financial and other data (e.g. email, social media, or health data)

Open finance

The sharing of financial data held at various financial institutions by a customer who consents to share the data with fintech or other third parties, who in turn process the data to provide customer-tailored services.

P2P/Peer to peer or person to person

Direct exchange between peers (including

computers) of the same status, or between people, without a centralised system or institution; can involve online (including fintech) platforms, e.g. peer-to-peer lending (P2PL).

Phishing

A fraudulent attempt to steal private information, money, or even a person's identity by tricking a person or organisation into revealing relevant information or codes to access financial accounts, or by directing them to websites that are scams.

PIN/Personal identification number

A numerical code that a customer uses to complete a financial transaction or to access software or a website, including for online financial services.

Platforms

Digital intermediary infrastructures bringing together different user groups, such as buyers and sellers or social media users, and that mostly gathers data about the users and interactions to improve its services and profits.

Ponzi scheme

A fraudulent financial scheme that uses money from recent investors to pay profits to earlier investors and requires a constant influx of new investors attracted by false promises that profits will come from legitimate business activity.

QR code

Quick response code: a type of barcode in a square-shaped grid that is easy for a digital device to read and that stores and provides instant access to online information.

Red flag

A signal or warning about danger or potential harm.

Regtech/Regulatory technology

Technology whose use enables better compliance with regulatory requirements.

Remittances

Cross-border transfers of often relatively small amounts of money, often payments by migrants to their family in their home country.

Revolving doors

Lobbying by persons who have previously worked at the company or organisation that they are targeting for their lobby activities

Robo-advice or robo-advisory services

Online automated software application with algorithms that gathers information on a customer through an online survey and based on this automatically advises, invests, and/or manages investments of the customer, choosing options provided by the investment provider.

Sandbox or regulatory sandbox

In finance, a live isolated testing process for a new fintech application or business model overseen by financial authorities before regulating the new application of business.

SaaS/Software-as-a-service

Software delivery online via a subscription, rather than bought and installed on individual computers, to provide services such as to financial service providers, including data processing and credit scoring.

Stablecoin

A digital currency/crypto-asset that is claimed to be exchangeable at a value of a predetermined official currency, asset, or pool of assets.

Super app

A digital application on a mobile device that provides access to a wide range of digital services at a single point of entry.

Suptech/Supervisory technology

Technology-enabled supervisory activities that are claimed to increase efficiency and effectiveness.

Surveillance capitalism

A concept in political economics describing the change in capitalism due to the spreading of corporate digitisation and widespread gathering of personal data by tech companies with the aim to change people's behaviour and make large profits.

Taxtech

Technology tools and digital services used for managing tax data, complying with tax rules or administer aggressive tax planning or tax evasion

Tokenisation

In financial contexts may refer to digital financial assets that allow P2P/peer-to-peer exchange or to an alternate account identifier on a variety of devices that links back to the primary account related to a payment card.

UPI/Unified payments interface

A mobile payment infrastructure set up by the

government of India (regulated by the central bank), used for commercial and government fintech payment applications.

Web3

A catch-all term for an internet ("world wide web") that claims to be more decentralisation by using blockchains, distributed ledger technology, crypto-currencies/assets, and NFTs; and aims to avoid concentration of data and content by big tech.



Colophon

Title: Fintech's red flags

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Date: March 2023

Editors: Miles Litvinoff, Elise Reynolds (Id Est)

Acknowledgements: We are grateful for the useful comments by Parminder Jeet Singh (ITforChange), Margarida Silva (SOMO), and Ujan Natic (SOMO).

Lay out: Sazza

Illustrations: Sazza

Published by: SOMO, Stichting Onderzoek
Multinationale Ondernemingen (SOMO)

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