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# **Sustainability, Financial Inclusion and Efficiency: A Trilemma or a Trifecta for the Regulation of Digital Finance?**

Dirk A. Zetsche,<sup>\*</sup> Douglas W. Arner,<sup>\*\*</sup> & Ross P. Buckley<sup>\*\*\*</sup>

This article argues that the digital transformation of finance is being driven by the quests for (i) efficiency, (ii) financial inclusion, and (iii) sustainability. These in turn are central to regulatory approaches to digital finance. We argue that – rather than a trilemma – the three factors in fact form a mutually reinforcing trifecta which can be supported and reinforced via appropriate policy, regulation and infrastructure. These three factors are necessarily intertwined: financial inclusion underpins long-term oriented economies, and unsustainable outcomes generate numerous risks for finance.

## **1. INTRODUCTION**

Over the past decade, financial policymakers and regulators have had to respond to the digital transformation of finance, today encapsulated in the term “financial technology” or “FinTech.” At the same time, sustainable development is perhaps the highest priority shared global objective, and increasingly centres upon the United Nations Sustainable Development Goals (UN SDGs) in tandem with the UN Framework Agreement on Climate Change (Paris Agreement). The UN SDGs provide a framework of detailed objectives and criteria for pursuing sustainable development, while the Paris Agreement focuses on agreements to limit global warming. Central banks and financial regulators across the world are considering how to enhance sustainable development through sustainable finance in the context of their wider mandates for financial and economic development, monetary and financial stability, financial integrity, and consumer protection.

Sustainable finance and FinTech are now major policy foci of most regulators, as demonstrated by a range of regulatory initiatives promoted by, inter alia, the United

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Nations (UN), the European Union (EU) and its Member States, the United Kingdom (UK), China and a range of other governments around the world, as well as the abundant research on both sustainability and FinTech.<sup>1</sup> Financial inclusion is likewise a focus of current global policy attention, driven by the G20,<sup>2</sup> World Bank,<sup>3</sup> and major development organizations.<sup>4</sup>

Yet little scholarly analysis has linked sustainable finance, FinTech and financial inclusion. We argue that rather than being a trilemma in which objectives conflict or even three unrelated siloes (which is how they are often treated in academic and policy discussions), the three are linked as together they drive the development of stable, efficient financial systems which are inclusive and support sustainable development. Further, we show that efficiency, financial inclusion, and sustainability are necessarily intertwined; each depends on the other. Financial inclusion is the precondition for a long-term oriented economy, while efficiency is needed for businesses to be profitable so that they may deliver sustainability and promote environmental goals which in turn can in fact provide incentives for businesses through innovation. Rather than a trilemma, they are a mutually reinforcing trifecta at the heart of financial policy and regulation.

This cross-disciplinary perspective is crucial: while most research has focussed on these three fields as separate, unrelated silos of knowledge,<sup>5</sup> this article considers the three together. This interdisciplinary tendency is increasingly seen in a range of reports of

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- <sup>1</sup> See Cristina Chueca Vergara & Luis Ferruz Agudo, “Fintech and Sustainability: Do They Affect Each Other?” (2021) 13:13 Sustainability 7012; David Mhlanga, “The Role of Financial Inclusion and FinTech in Addressing Climate-Related Challenges in the Industry 4.0: Lessons for Sustainable Development Goals” (2022) 4 Frontiers in Climate 1.
  - <sup>2</sup> See Global Partnership for Financial Inclusion, *G20 2020 Financial Inclusion Action Plan* (20 October 2020), online (report): <https://www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan>.
  - <sup>3</sup> See the World Bank’s financial inclusion policy work at [www.worldbank.org/en/topic/financialinclusion](http://www.worldbank.org/en/topic/financialinclusion).
  - <sup>4</sup> Including the International Monetary Fund, the Organisation for Economic Co-operation and Development, and others, non-governmental organizations such as Alliance for Financial Inclusion, The Toronto Centre, and Microfinance Centre, as well as the state-sponsored development banks (European Investment Bank, Asian Development Bank, Inter-American Development Bank, Federal Deposit Insurance Corporation, etc.).
  - <sup>5</sup> To our knowledge, there are three exceptions: Douglas W Arner et al, “Sustainability, FinTech and Financial Inclusion” (2020) 21(1) European Business Organization L Rev 7; Iris HY Chiu & Edward F Greene, “The Marriage of Technology, Markets and Sustainable (and) Social Finance” (2019) 20:1 European Business Organisation L Rev 139; Dirk A Zetzsche, Ross P Buckley & Douglas W Arner, “FinTech for Financial Inclusion: Driving Sustainable Growth” in Julia Walker, Alma Pekmezovic and Gordon Walker (eds), *Sustainable Development Goals: Harnessing Business to Achieve the SDGs through Finance, Technology, and Law Reform* (Wiley, 2019) at 177.

the G20, UN,<sup>6</sup> and the Alliance for Financial Inclusion.<sup>7</sup> In fact, if sustainable development is seen as the overriding objective, efficiency and inclusion are central to this process, with finance, technology, and innovation providing the means.

In Sections II and III we analyze how efficiency and financial inclusion considerations, respectively, kickstarted the digital transformation of finance, and then in Section IV we show how sustainability has provided further impetus in recent years. Section V then analyses the interrelationship between the three factors, concluding that all three together explain the different elements of FinTech and RegTech seen today, before Section VI concludes.

## 2. THE ECONOMICS OF FINTECH: DRIVING EFFICIENCY

At the heart of FinTech lie the efficiencies and performance enhancements arising from technology. These are generated by three economic features of FinTech and technology generally: (i) conventional economies of scale, (ii) data-driven economies of scale, and (iii) network effects. These factors together explain why we often see FinTech firms develop *digital finance platforms* to offer their services.<sup>8</sup>

### (a) Reducing Costs of Output per Unit

Information technology enables a financial institution to decrease the costs of output per service to a level where the income generated from each additional customer or client accrues almost entirely to its profits. While this may well prompt the need for a regulatory response to the resulting market concentration and monopoly power, to a real extent these factors drive the digital transformation of finance: if the winner takes almost all the profits, there is a strong incentive, as we have seen over and over again, to invest enormous resources to win.

#### (i) *Conventional Economies of Scale*

Economies of scale refer to the reduction in per-unit production costs arising from the

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<sup>6</sup> Global Partnership for Financial Inclusion, “G20 2020 Financial Inclusion Action Plan” (October 2020), online: *GPFI* [www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan](http://www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan); Global Partnership for Financial Inclusion, “G20 Financial Inclusion Action Plan Progress Report 2017 – 2020” (October 2020), online: *GPFI* [www.gpfi.org/publications/g20-fiap-progress-report-2017-2020](http://www.gpfi.org/publications/g20-fiap-progress-report-2017-2020); Douglas Arner et al, “A Principles-Based Approach to the Governance of BigFintechs” (December 2021), online (pdf): *UNDP* [www.undp.org/sites/g/files/zskgke326/files/2021-10/UNDP-UNCDF-TP-3-3-A-Principles-based-Approach-to-the-Governance-of-BigFintechs-EN.pdf](http://www.undp.org/sites/g/files/zskgke326/files/2021-10/UNDP-UNCDF-TP-3-3-A-Principles-based-Approach-to-the-Governance-of-BigFintechs-EN.pdf).

<sup>7</sup> Alliance for Financial Inclusion (AFI), “Inclusive Green Finance” (2022), online: *AFI* <https://www.afi-global.org/thematic-areas/inclusive-green-finance>.

<sup>8</sup> Daniel Haberly et al, “Asset Management as a Digital Platform Industry: A Global Network Perspective” (2019) 106 *Geoforum* 167 at 169; Douglas W Arner, János Barberis & Ross P Buckley, “FinTech, RegTech and the Reconceptualization of Financial Regulation” (2017) 37(3) *NW J Intl L & Bus* 371; See Peter C Evans & Annabelle Gawer, “The Rise of the Platform Enterprise: A Survey” (January 2016), online (pdf): *The Center for Global Enterprise* [https://www.thecge.net/app/uploads/2016/01/PDF-WEB-Platform-Survey\\_01\\_12.pdf](https://www.thecge.net/app/uploads/2016/01/PDF-WEB-Platform-Survey_01_12.pdf).

increased production of units.<sup>9</sup> FinTech business models exhibit these conventional economies of scale because the costs of providing the service to a high number of users are often fixed. Once the applications have been coded, the interfaces established, and the servers set up or leased, connecting each additional client incurs very low marginal costs. Where additional users mean additional marginal costs for energy and data warehousing, these additional costs per user are often offset by the additional data these users create.<sup>10</sup> This data allows the platform provider to choose, more or less freely, which services it will charge for, and which services will be provided ostensibly for free. This platform economy is often called the gig economy or sharing economy.

A useful example is the asset management industry – particularly with passive investment – where large entities can invest in software programming and development themselves, while small asset managers are usually price takers who must pay software licensing and data warehousing fees that are high, relative to their business size. The more important the technology is for the industry, and the more software tools that are required, the higher these costs are in proportion to other expenses, and the greater the incentive to subscribe to an existing platform that relieves the small managers of this burden. Given technology is rapidly becoming ever more important, smaller asset managers have no choice but to contract with a platform or be inhibited in their growth by IT limitations and costs.

(ii) *Data-Driven Economies of Scale*

The second type of economies of scale result from the data collected and used for the application. In simple terms: “[m]ore information lets firms develop better services, which attracts more users, which in turn generate more data.”<sup>11</sup> Where risk management depends on data, such management should improve when the digital finance provider can collect more and better structured data.

For example, Blackrock, one of the largest service providers to investment funds worldwide, has developed a risk data aggregating and risk management system named Aladdin, which stands for “Asset, Liability and Debt and Derivative Investment Network” and which we discuss further below. Aladdin monitors more than 2,000 risk factors each day, from interest rates to currencies, and performs 5,000 portfolio stress tests and 180 million option-adjusted calculations each week<sup>12</sup> – far more than any other risk analytics firm in the world. Accordingly, no other risk analytics firm can match

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<sup>9</sup> These scale economies are particularly present in software markets where the costs of the original application (“first copy”) are enormous, while the costs of the second and subsequent copies are minimal and become close to zero. While licensing models and modern anti-piracy devices restrict software users from making use of these characteristics, the software producer and licensor are not bound by these restrictions and is free, in principle, if pressed by its competitor to reduce the price.

<sup>10</sup> See Tim Wu, *The Master Switch: The Rise and Fall of Information Empires* (Vintage, 2011); Ariel Ezrachi & Maurice E Stucke, *Virtual Competition: The Promise and Perils of the Algorithm-Driven Economy* (Harvard University Press, 2016).

<sup>11</sup> The Economist, “How Regulators Can Prevent Excessive Concentration Online” (28 June 2018), online: *The Economist* <https://www.economist.com/special-report/2018/06/28/how-regulators-can-prevent-excessive-concentration-online>.

<sup>12</sup> BlackRock, ‘Risk Managers’, *Aladdin* (2022), online: *Blackrock* <https://www.blackrock.com/aladdin/benefits/risk-managers>.

Aladdin's predictive capabilities.

(iii) *Network Effects*

Digital finance exhibits strong network effects. Network effects occur where an additional user of a service adds value to the product for other users – the more users, the greater the benefit.<sup>13</sup> For instance, a telephone is of little use if the phone network has few subscribers. The more people who can be called, the more valuable the phone. Network effects are particularly prominent in financial services for several reasons.

First, the value of a software-based “network” grows in proportion to the numbers of copies installed in financial services firms as the look and feel of software becomes embedded in human processes. Users know where to click, which shortcuts to use, and how to upload data or link to the Internet. The more a particular software is used among specialist financial services firms, the more employees expect this software and its features in their work environment.

Second, each additional user adds data to the existing pool. Take again the example of risk management and BlackRock's Aladdin. Where risk management can draw on more data from more firms, the predictive power of the platform's algorithms improves. As Aladdin's risk management data reflect the exposure of the portfolios managed by the world's largest asset managers (although in an anonymized way and with information barriers preventing the transfer of inside information), the data provided and generated by their clients form the basis of Aladdin's “collective intelligence.”<sup>14</sup> This turns into a business rationale in itself: the data generated by its users provide the very reason other clients seek to license Aladdin's services. At the same time, since these data could be used for front running the strategies of these managers, rules addressing data confidentiality, use, and protection are key.

In this way, Aladdin overcomes the main deficiency of firm-specific data pools which suffer from data shortages in relation to low frequency risk events. Among these, internal fraud, business disruption, and IT failures are potentially of “high severity”; that is, these operational risks can threaten the existence of a financial institution.<sup>15</sup> Aladdin's predictive power is not impaired by such data shortages as it can use the data of all its asset manager clients rather than just the data generated by BlackRock itself. In this case, *all* network participants benefit from pooling risk data.

### **(b) Reducing Costs of Output per Unit**

The economic features described above are transforming the financial services industry into a platform industry. In plain language, platforms are “a place or opportunity for

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<sup>13</sup> See Amrit Tiwana, *Platform Ecosystems: Aligning Architecture, Governance, and Strategy* (Morgan Kaufmann, 2014) 33–48 (analysing the benefits to users of greater total users).

<sup>14</sup> BlackRock, “Powering Collective Intelligence” (2022), online: *Aladdin* <https://www.BlackRock.com/aladdin/benefits/organizations>.

<sup>15</sup> Joseba Eceiza et al, “The future of Operational-risk Management in Financial Services” April 2020), online: *McKinsey & Company* <https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/the-future-of-operational-risk-management-in-financial-services>.

communicating ideas and information.”<sup>16</sup> In the digital finance context, the term “platform” refers to a systems architecture where multiple applications are linked to and through one technical infrastructure so that users can use one major integrating software system in order to run all applications written for that system.<sup>17</sup> Platformisation produces financial ecosystems with multiple services provided to clients via the platform. The platform serves as the indispensable technical core that links all services and clients, and often also provides some services itself.

Functioning as a “spider in the web”,<sup>18</sup> a digital finance platform gathers data concerning users and their activities, which is then used to further develop platform applications and services to users, resulting in the gradual expansion of the platform in scale and scope. In turn, the overhead costs of the services provided gradually decline, compared to the economic value provided. Characteristic of platforms is “some mixture of both technology-enabled efficiency enhancement, and technology-enabled organizational arbitrage”, enabled by the control the platform providers gain over markets while enhancing their efficiency.<sup>19</sup>

Risk management systems drawing on deep data pools, for instance, are expected to gain ever-greater predictive powers, and platform providers can generate additional returns by leveraging this data power into related, yet new, types of business (in the absence of legal restrictions). For instance, if risk data suggests a certain asset combination assists in hedging a given type of risk, this insight can underpin the issuance of a derivative or fund product that offers that combination of assets.

Owing to the evolution of the MAGMAs (Meta —formerly Facebook— Apple, Google, Microsoft, and Amazon) and BATs (Baidu, Alibaba, and Tencent in China), features of technology platforms have become a major focus of contemporary legal scholarship.<sup>20</sup> As has become obvious since the COVID-19 pandemic, e-commerce platforms provide unique benefits – centralized offerings of products and decentralized

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<sup>16</sup> Merriam-Webster (2 November 2022) sub verbo “platform” online: *Merriam Webster* <https://www.merriam-webster.com/dictionary/platform>.

<sup>17</sup> Dirk A Zetsche et al, “Digital Finance Platforms: Toward a New Regulatory Paradigm” (2020) 23:1 U Pennsylvania J Bus L 273; See also Marc H Meyer & Alvin P Lehnerd, *The Power Of Product Platforms* (The Free Press, 1997) at 7 (defining a platform as “a set of common components, modules, or parts from which a stream of derivative products can be efficiently created and launched”).

<sup>18</sup> Dirk A Zetsche et al, “Digital Finance Platforms: Toward a New Regulatory Paradigm” (2020) 23:1 U Pennsylvania J Bus L 273.

<sup>19</sup> Daniel Haberly et al, “Asset Management as a Digital Platform Industry: A Global Network Perspective” (2019) 106 *Geoforum* 167 at 168 (discussing cost reductions and efficiency enhancements resulting from disruptive platforms in markets not traditionally centered around information and communications technology).

<sup>20</sup> See Tianxiang He, “Online Content Platforms, Copyright Decision-Making Algorithms and Fundamental Rights Protection in China” (2022) 14:1 *Law, Innovation and Technology* 71; Michael Guihot and Hannah McNaught, “Platform Power, Technology, and Law: Consumer Powerlessness in Informational Capitalism” (2021) 13:2 *Law, Innovation and Technology* 510.



delivery of them.<sup>21</sup> They also need e-payments, thus promoting digital finance. At the same time, the platform economy is seen as a catalyst for social issues that touch all aspects of society, ranging across privacy, product liability, public housing, discrimination, labor and employment law, and tax law. Platforms are also at the heart of the discussions about "fake news" and electoral manipulation as well as manipulation of consumer prices, search results and scoring power.

### (c) Examples

It is instructive to consider examples of FinTech developments, from both the private and public sector, which demonstrate the benefits to be gained from combining conventional and data-driven scale economies and network effects.

#### (iv) *BlackRock's Aladdin*

At its core, Aladdin is a technology tool that allows asset managers to "communicate effectively, address problems quickly, and make informed decisions at every step of the investment process."<sup>22</sup> BlackRock began developing Aladdin for its own portfolio and risk management, investment processes, and trade execution in 1993. From there, Aladdin moved into automatic position-keeping, record-keeping, and control of risk exposure. Aladdin's capabilities became known outside the asset management community during the 2008 Global Financial Crisis, when governments globally struggled to evaluate the risk exposure underlying the portfolios of global investment banks.<sup>23</sup> The platform has since expanded into risk analysis and other parts of the investment process and evolved into an end-to-end investment platform that "combines sophisticated risk analytics with comprehensive portfolio management, trading and operations tools on a single platform to power informed decision-making, effective risk management, efficient trading and operational scale."<sup>24</sup>

Aladdin is a hosted service: the technical infrastructure, system administration, and interfacing with data providers and industry utilities are operated by BlackRock's IT and technical staff, who focus on creating data and analyses for clients.<sup>25</sup> The scale of Aladdin is impressive. More than \$21.6 trillion in assets, around ten percent of the world's stocks and bonds, depend on Aladdin's services – a figure equal to four times

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<sup>21</sup> See Tom Phillips, "PayPal and Alipay Top Digital Wallet Leaderboard" (27 April 2022), online: *NFCW* [www.nfcw.com/2022/04/27/376968/paypal-and-alipay-top-digital-walletleaderboard](https://www.nfcw.com/2022/04/27/376968/paypal-and-alipay-top-digital-walletleaderboard); Laura LaBerge et al, "How COVID-19 Has Pushed Companies over the Technology Tipping Point: And Transformed Business Forever" (5 October 2020), online: *McKinsey & Company* [www.mckinsey.com/business-functions/strategy-and-corporatefinance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-pointand-transformed-business-forever](https://www.mckinsey.com/business-functions/strategy-and-corporatefinance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-pointand-transformed-business-forever).

<sup>22</sup> Dirk A Zetzsche et al, *supra* note 19 at 288.

<sup>23</sup> Richard Henderson & Owen Walker, "Inside BlackRock's Black Box: The World's Most Powerful Risk Management System Threatens to Become a Liability for Its Owner" (26 February 2022), online: *Australian Financial Review* [www.afr.com/companies/financial-services/does-blackrock-s-aladdin-have-too-many-under-its-spell-20200226-p544ex](https://www.afr.com/companies/financial-services/does-blackrock-s-aladdin-have-too-many-under-its-spell-20200226-p544ex).

<sup>24</sup> Zetzsche et al, *supra* note 18.

<sup>25</sup> Hayley McDowell, "BlackRock to Host Aladdin Platform on Microsoft Cloud: Microsoft Azure Cloud Will Host BlackRock's Flagship Investment Operations Platform Aladdin to Boost Computing Scale and Client Experience" (8 April 2020), online: *The Trade* [www.thetradenews.com/blackrock-host-aladdin-platform-microsoft-cloud](https://www.thetradenews.com/blackrock-host-aladdin-platform-microsoft-cloud).



the value of all cash in the world, the annual GDP of the United States, or the total United States stock market capitalization. Approximately 55,000 investment professionals globally rely on Aladdin and Aladdin Wealth. Aladdin hosts the portfolios of at least 240 institutions worldwide, including some of the largest asset owners (e.g. California State Teachers' Retirement System (CalSTRS)) and competitors including Schrodgers and Vanguard).<sup>26</sup> The technology services revenue of BlackRock from Aladdin systems increased by twelve percent in 2021 to US \$1.3 billion.<sup>27</sup>

(v) *Ant Group*

Although Aladdin is a giant, numerically, Ant Group, prior to government intervention in 2020, the provider of the world's largest financial ecosystem, was even more impressive. Ant Group is the financial arm of the Chinese BigTech, Alibaba. Developed originally as a support function for e-commerce in the form of Alipay, Ant (named Ant Financial until July 2020) today comprises a payment system, a custody function for its clients, robo-advisory and asset management services, and credit, investment, and insurance products of its own and other firms. A particularly interesting service within the Ant ecosystem is the money market mutual fund, Yu'e Bao, which was launched in 2013 as an alternative saving and investment tool for the balance of client money in their Alipay accounts. Before its 2018 peak, Yu'e Bao become the largest such fund in the world in 2017.<sup>28</sup>

Ant has also become one of the largest providers of both consumer and SME lending in China. Ant's objective is to provide a comprehensive ecosystem that allows customers to buy whatever they want through e-commerce platforms and physical and virtual merchants throughout the world via Alipay. Ant funds itself through fees, sales of data, and borrowing in China's Interbank Bond Market. It then lends to individuals to help them buy products through Alibaba and other vendors while also providing credit to businesses to enable them to expand their operations, income, and profits.<sup>29</sup> Ant in turn securitizes those loans and is one of the largest issuers of asset-backed securities in China.<sup>30</sup> The more than 700 million Chinese active users can, in turn, use the funds in Ant's Alipay system for other payments or investments, earning attractive

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<sup>26</sup> Zetzsche et al, *supra* note 19 at 287-290; Rebecca Ungarino, "Here Are 9 Fascinating Facts to Know about BlackRock, the World's Largest Asset Manager" (11 March 2022), online: Insider [www.businessinsider.com/what-to-know-about-blackrock-larry-fink-biden-cabinet-facts-2020-12](https://www.businessinsider.com/what-to-know-about-blackrock-larry-fink-biden-cabinet-facts-2020-12).

<sup>27</sup> BlackRock, "Investing with Purpose: BlackRock 2021 Annual Report" (2021), online (pdf): Blackrock <[https://s24.q4cdn.com/856567660/files/doc\\_financials/2021/ar/online/pdfs/BlackRock\\_2021\\_AR\\_Complete\\_040822.pdf](https://s24.q4cdn.com/856567660/files/doc_financials/2021/ar/online/pdfs/BlackRock_2021_AR_Complete_040822.pdf) at 11.

<sup>28</sup> Quan Yue & Denise Jia, "China Curbs Money Market Funds, among Them Ant's Yu'e Bao" (17 January 2022), online: NikkeiAsia [asia.nikkei.com/Spotlight/Caixin/China-curbs-money-market-funds-among-them-Ant-s-Yu-e-Bao](https://asia.nikkei.com/Spotlight/Caixin/China-curbs-money-market-funds-among-them-Ant-s-Yu-e-Bao); see also Stella Yifan Xie, "More Than a Third of China Is Now Invested in One Giant Mutual Fund" (27 March 2019), online: *The Wall Street Journal* [www.wsj.com/articles/morethan-a-third-of-china-is-now-invested-in-one-giant-mutual-fund-11553682785](https://www.wsj.com/articles/morethan-a-third-of-china-is-now-invested-in-one-giant-mutual-fund-11553682785).

<sup>29</sup> Ant Group branched into platform lending and in 2018 became one of the largest consumer and MSME lenders in China. See Jon Frost et al, "BigTech and the Changing Structure of Financial Intermediation" (2019) Bank for International Settlements Working Paper No. 779 at 10 [www.bis.org/publ/work779.htm](https://www.bis.org/publ/work779.htm).

<sup>30</sup> *Ibid.*

returns through money market funds, an increasing range of ETFs, and other investment products including insurance.

Even in the aftermath of the start of government intervention in 2020, the Ant ecosystem covers all aspects of finance. Hundreds of millions of individuals and firms participate in its financial ecosystem, interacting with third-company providers and funding commercial borrowers both directly and through the capital markets.<sup>31</sup> At its height in November 2020, immediately prior to its planned IPO in Hong Kong and Shanghai, Ant had a valuation of \$280 billion. Had that IPO taken place, it would have been one of the world's largest financial companies.<sup>32</sup>

Alipay, its payments service, is estimated to have around 900 million users in China and 1.3 billion users globally.<sup>33</sup> It has over one-half of the Chinese payments market, and executes more than \$16 trillion in transactions, equivalent to four times China's nominal GDP. The number of merchants that accept payments by Alipay is around 80 million.<sup>34</sup> In August 2022, there were around 19 million visits to Alipay.com from around the world.<sup>35</sup> The reach of Ant extends beyond payments. All of China's 116 mutual fund managers are on the platform reaching an additional 180 million users. The potential scope of economic and financial disruption caused by a failure or hacking of Ant's platform is immense and these concerns – among many others – led to a decision to subject it to increased regulation by mainland Chinese and Hong Kong regulators, causing the IPO in November 2020 to be suspended indefinitely.

(vi) *Aadhaar as Public Sector Example*

Efficiencies are not only generated by private players seeking to dominate a market. The public sector can also seek to increase the efficiency of the financial system, making use of the same economic features. Take the example of India's Aadhaar system:<sup>36</sup> Aadhaar has proven extremely useful in terms of financial inclusion and efficiency, facilitating access to financial accounts and digitization of government

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<sup>31</sup> By 2020, Ant had expanded across payments, wealth management, lending, insurance, credit scoring, and data sales services. See Financial Stability Board, "BigTech Firms in Finance in Emerging Market and Developing Economies: Market Developments and Potential Financial Stability Implications" (12 October 2020), online (pdf): *FSB* at 4.

<sup>32</sup> If the IPO had proceeded as expected, Ant would have had about the market capitalisation of PayPal, about two-thirds that of JP Morgan, one-third that of Facebook and one fifth that of Google, though Ant and Alibaba combined would not be close in size to these US companies.

<sup>33</sup> Michael Singer, "Alipay Statistics 2022: Market Share, Facts and Marketing Trends" (10 November 2022), online: *EnterpriseAppsToday* [www.enterpriseappstoday.com/stats/alipay-statistics.html#:~:text=To%20date%2C%20Alipay%20has%20around,platform%20for%20the%20year%202022](http://www.enterpriseappstoday.com/stats/alipay-statistics.html#:~:text=To%20date%2C%20Alipay%20has%20around,platform%20for%20the%20year%202022).

<sup>34</sup> *Ibid.*

<sup>35</sup> *Ibid.*

<sup>36</sup> Srijoni Sen, "A Decade of Aadhaar: Lessons in Implementing a Foundational ID System" Issue Brief No 292 (3 May 2019), online: *Observer Research Foundation* [www.orfonline.org/research/a-decade-of-aadhaar-lessons-in-implementing-a-foundational-id-system-50464/](http://www.orfonline.org/research/a-decade-of-aadhaar-lessons-in-implementing-a-foundational-id-system-50464/); John Thornhill, "India's All-Encompassing ID System Holds Warnings for the Rest of World" (11 November 2021), online: *Financial Times* <https://www.ft.com/content/337f6d6e-7301-4ef4-a26d-a4e62f602947>.

payments and services.<sup>37</sup> When combined with other elements of the India Stack strategy, this has enabled far faster and more secure public spending.<sup>38</sup> Aadhaar's standardized data interfaces have proven instrumental in increasing efficiency and lowering costs in the private sector.<sup>39</sup> Drawing on Aadhaar, new suppliers created entirely new services, time for opening a bank account fell from weeks to minutes, and bank fees in India plummeted to a level reflecting digital rather than manual processes. All of this would have been impossible in the absence of data-driven and conventional economies of scale and the network effects created by the standards for customer and transactional identification, which lie at the heart of the Aadhaar system.

### 3. FINANCIAL INCLUSION

Along with efficiency, financial inclusion was one of the early drivers of the FinTech revolution in the Global South, especially in East Africa and parts of East Asia.

#### (a) Financial Inclusion: A Policy Agenda

Financial inclusion involves delivering financial services at an affordable cost to all parts of society. It enables people to manage their financial obligations efficiently and think longer term. Financial inclusion thereby reduces poverty and supports wider economic growth.<sup>40</sup>

#### (b) Technology as Enabler

Technology has proven critical for financial inclusion. As of 2021, just under 1.9 billion adults lacked access to a financial or mobile money account, some twenty-four percent

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<sup>37</sup> Aadhaar is a government-driven, national biometric database and identification system that has transformed financial inclusion. Aadhaar is operated by the Unique Identification Authority of India (UIDAI) that issues a 12-digit randomized number to all residents on a voluntary basis. See "What is Aadhaar" (9 December 2022) online: *Unique Identification Authority of India* [www.uidai.gov.in/en/16-english-uk/aapka-aadhaar/14-what-is-aadhaar.html#:~:text=Aadhaar%20is%20a%2012%20digit%20individual%20identification%20number%20issued%20by,and%20address%2C%20anywhere%20in%20India](http://www.uidai.gov.in/en/16-english-uk/aapka-aadhaar/14-what-is-aadhaar.html#:~:text=Aadhaar%20is%20a%2012%20digit%20individual%20identification%20number%20issued%20by,and%20address%2C%20anywhere%20in%20India) (since its initiation, almost the entire Indian population (1.2 billion of approximately 1.38 billion people) have enrolled to benefit from access to social benefits, banking and insurance, and other services. It has conducted 67 billion digital identity verifications, and is processing 2.8 billion monthly real-time mobile payments with a monthly transaction value of 5.47 trillion INR); see "India Stack" online: *India Stack* <https://www.indiastack.org/index.html>.

<sup>38</sup> "India Stack" is a comprehensive strategy that combines a national system of digital identification, a national digital payments system supporting interoperability across traditional and new payments technologies and providers, an eKYC system to support account opening and use, and the commitment to use this infrastructure for a range of government and other services such as tax and salary payments. See "India Stack" online: *India Stack* [www.indiastack.org/index.html](http://www.indiastack.org/index.html).

<sup>39</sup> *Ibid*; see also Yan Carrière-Swallow, Vikram Haksar & Manasa Patnam, "India's Approach to Open Banking: Some Implications for Financial Inclusion" (2021) IMF Working Paper WP/21/52 at 4.

<sup>40</sup> The World Bank, "Financial Inclusion" (29 Mar 2022), online: *World Bank* [www.worldbank.org/en/topic/financialinclusion/overview](http://www.worldbank.org/en/topic/financialinclusion/overview).

of the world's population.<sup>41</sup> Significantly, though, between 2011 and 2021, account ownership increased by fifty percent, mostly in developing countries.<sup>42</sup> Much of this progress came from the impact of technology on finance. For example, mobile money has played a major role in increasing financial inclusion in Kenya and East Africa.<sup>43</sup> China has rapidly developed into perhaps the world's most digitized financial system.<sup>44</sup> India has dramatically increased financial access by building the infrastructure for a new digital economy, leading to hundreds of millions of people gaining accounts.<sup>45</sup>

Technology facilitates financial inclusion in three ways. First, technology helps overcome the last mile-issue in remote areas. Where bank branches are distant, the internet enables digital substitutes. Second, technology allows for better tailoring of financial services to users. For instance, people with lower financial literacy can receive tailor-made services and information, mitigating their inability to make complex financial decisions, or auto-translation software may overcome language barriers in markets with high language diversity. Third, technology may be used to counter abuses, either by embedding financial inclusion requirements into technology ("compliance-by-design") or by detecting exclusive approaches. For example, algorithms employed by the financial institution itself or its regulator can detect whether the institution's credit scoring algorithm excludes certain customer groups in terms of race, age or gender.<sup>46</sup>

All of this explains the emphasis various regulatory bodies have put on FinTech for Financial Inclusion (FT4FI) initiatives. The 2008 financial crisis prompted sweeping regulatory responses coordinated by the G20 aimed at building a resilient global financial system. This led to the establishment of the Financial Inclusion Experts Group

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<sup>41</sup> Asli Demirguc-Kunt et al, "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19 (2022), online: *The World Bank* [www.worldbank.org/en/publication/globalfindex/Report](http://www.worldbank.org/en/publication/globalfindex/Report) at 11.

<sup>42</sup> *Ibid.*

<sup>43</sup> Seth Onyango, "Africa Accounts for 70% of the World's \$1 Trillion Mobile Money Market" (4 May 2022), online: *Quartz Africa* <https://qz.com/africa/2161960/gsma-70-percent-of-the-worlds-1-trillion-mobile-money-market-is-in-africa>; GSMA, "State of the Industry Report on Mobile Money 2022 (2022) online (pdf): GSMA [www.gsma.com/sotir/wp-content/uploads/2022/03/GSMA\\_State\\_of\\_the\\_Industry\\_2022\\_English.pdf](http://www.gsma.com/sotir/wp-content/uploads/2022/03/GSMA_State_of_the_Industry_2022_English.pdf) at 18, 90.

<sup>44</sup> Dagny Dukach, "Understanding the Rise of Tech in China" online: *Harvard Business Review* [hbr.org/2022/09/understanding-the-rise-of-tech-in-china](http://hbr.org/2022/09/understanding-the-rise-of-tech-in-china); Aaron Klein, "China's Digital Payments Revolution" (April 2020) online: *Brookings* [www.brookings.edu/research/chinas-digital-payments-revolution/](http://www.brookings.edu/research/chinas-digital-payments-revolution/); see also Alexandra Schirmer, "Payment Methods in China: How China Became a Mobile-First Nation" (3 August 2022), online: *Daxue Consulting* <https://daxueconsulting.com/payment-methodsin-china>.

<sup>45</sup> Douglas W Arner et al, "The Identity Challenge in Finance" (2019) 20:1 *Eur Bus L Rev* 55 at 64. See also Shruti Jain, "The G20 Digital Economy Agenda for India" (13 September 2022), online: *Observer Research Foundation* [www.orfonline.org/wp-content/uploads/2022/09/ORF\\_OP-365\\_India-G20-Digital-Economy.pdf](http://www.orfonline.org/wp-content/uploads/2022/09/ORF_OP-365_India-G20-Digital-Economy.pdf).

<sup>46</sup> Nicol Turner Lee, Paul Resnick & Genie Barton, "Algorithmic Bias Detection and Mitigation: Best Practices and Policies to Reduce Consumer Harms" (22 May 2019), online: *Brookings* < [www.brookings.edu/research/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms](http://www.brookings.edu/research/algorithmic-bias-detection-and-mitigation-best-practices-and-policies-to-reduce-consumer-harms); François Cadelon et al, "AI Regulation Is Coming: How to prepare for the inevitable" (October 2021), online: *Harvard Business Review* <https://hbr.org/2021/09/ai-regulation-is-coming>.

(FIEG),<sup>47</sup> Global Partnership for Financial Inclusion (GPFI) and the endorsement of the first Financial Inclusion Action Plan (FIAP) by G20 leaders in 2010, later revised in 2017 and 2020.<sup>48</sup>

GPFI recognized digital financial solutions as critical to facilitating global financial inclusion in 2016<sup>49</sup> and introduced the G20 High Level Principles for Digital Financial Inclusion (HLPs).<sup>50</sup> Alongside the Recommendations for Responsible Finance<sup>51</sup> and the ID4D,<sup>52</sup> the HLPs encourage and guide governments to embrace digital approaches to financial inclusion. In 2020, the FIAP was updated to reflect the pivotal role of digitization.<sup>53</sup>

The Alliance for Financial Inclusion (AFI) was established in 2008 by the central banks of developing countries.<sup>54</sup> In 2012, its members signed the historic Maya Declaration on Financial Inclusion, by which developing countries committed to financial inclusion

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<sup>47</sup> G20 Financial Inclusion Experts Group, “Innovative Financial Inclusion: Principles and Report on Innovative Financial Inclusion from the Access through Innovation Sub-group of the G20 Financial Inclusion Experts Group” (25 May 2010) online (pdf): *GPFI* [www.gpfi.org/sites/gpfi/files/documents/Principles%20and%20Report%20on%20Innovative%20Financial%20Inclusion\\_0.pdf](http://www.gpfi.org/sites/gpfi/files/documents/Principles%20and%20Report%20on%20Innovative%20Financial%20Inclusion_0.pdf).

<sup>48</sup> For the latest version: see Global Partnership for Financial Inclusion (GPFI), *G20 2020 Financial Inclusion Action Plan* (20 October 2020) online: *GPFI* [www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan](http://www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan); Ross P Buckley, “The G20’s Performance in Global Financial Regulation” (2014) 37:1 UNSWLJ 63.

<sup>49</sup> GPFI, “G20 Financial Inclusion Indicators Update” (2016), online (pdf): *GPFI* [www.gpfi.org/sites/gpfi/files/documents/G20%20Financial%20Inclusion%20Indicators%20%282016%20Update%29.pdf](http://www.gpfi.org/sites/gpfi/files/documents/G20%20Financial%20Inclusion%20Indicators%20%282016%20Update%29.pdf).

<sup>50</sup> GPFI, “G20 High-Level Principles for Digital Financial Inclusion” (16 September 2016), online (pdf): [www.gpfi.org/sites/gpfi/files/G20%20High%20Level%20Principles%20for%20Digital%20Financial%20Inclusion.pdf](http://www.gpfi.org/sites/gpfi/files/G20%20High%20Level%20Principles%20for%20Digital%20Financial%20Inclusion.pdf); GPFI, “Digital Financial Inclusion: Emerging Policy Approaches” (23 May 2017) online (pdf): *GPFI* [www.gpfi.org/sites/gpfi/files/documents/Digital%20Financial%20Inclusion-CompleteReport-Final-A4.pdf](http://www.gpfi.org/sites/gpfi/files/documents/Digital%20Financial%20Inclusion-CompleteReport-Final-A4.pdf); GPFI, “G20 High-Level Policy Guidelines on Digital Financial Inclusion for Youth, Women and SMEs” (19 July 2020), online (pdf): *GPFI* [www.gpfi.org/sites/gpfi/files/G20%20High%20Level%20Principles%20for%20Digital%20Financial%20Inclusion.pdf](http://www.gpfi.org/sites/gpfi/files/G20%20High%20Level%20Principles%20for%20Digital%20Financial%20Inclusion.pdf).

<sup>51</sup> See Centre for Financial Inclusion, “Detailed Guidance on the Client Protection Principles” (1 June 2019), online: *CFI* [www.centerforfinancialinclusion.org/detailed-guidance-on-the-client-protection-principles](http://www.centerforfinancialinclusion.org/detailed-guidance-on-the-client-protection-principles); Responsible Finance Forum, “The Responsible Finance Forum (RFF) Begins a New Chapter” (August 2022), online (pdf): *CFI* [content.centerforfinancialinclusion.org/wp-content/uploads/sites/2/2022/08/RFF-2022-Summary-Report-1.pdf](http://content.centerforfinancialinclusion.org/wp-content/uploads/sites/2/2022/08/RFF-2022-Summary-Report-1.pdf).

<sup>52</sup> See World Bank, “Identification for Development” online: *World Bank* <https://id4d.worldbank.org>.

<sup>53</sup> GPFI, “G20 2020 Financial Inclusion Action Plan” (20 October 2020), online: *GPFI* [www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan](http://www.gpfi.org/publications/g20-2020-financial-inclusion-action-plan).

<sup>54</sup> Alliance for Financial Inclusion (AFI), “AFI becomes fully-independent, member-supported organization” (27 January 2016), online: *AFI* [www.afi-global.org/newsroom/news/alliance-for-financial-inclusion-achieves-full-independence](http://www.afi-global.org/newsroom/news/alliance-for-financial-inclusion-achieves-full-independence).



targets and national policy changes.<sup>55</sup> Other agreements have followed.

The UN established the Task Force on Digital Financing in November 2018 to develop strategies that promote financial technology to advance the SDGs.<sup>56</sup> It is committed to "put[ting] people at the centre", supporting our view that FinTech is an important, possibly the most important, single accelerator for attaining the SDGs.<sup>57</sup>

The COVID-19 pandemic has disrupted many parts of the global supply chain. It also created difficulties for advancing the financial inclusion agenda where crucial elements of financial onboarding rely on manual work, particularly around client identification for AML/KYC purposes. Nonetheless, despite the challenges, the pandemic has on balance markedly accelerated financial inclusion, as it forced regulators to accept digital substitutes for in-person contact.

### (c) Financial Inclusion: A Global South Topic?

Formal financial exclusion is less widespread in countries in the Global North, but this does not mean that their populations know how to use their bank access well. As of 2014, only 33% of all adults globally (and only 38% of account-owning adults) were found to be financially literate (among them 57% in major advanced economies, and 30% in major emerging economies).<sup>58</sup> Financial literacy means the ability to manage one's finances independently, without a financial advisor. Assuming that approximately one third of the world's population are children, and subtracting the 1.7 billion formally excluded from the financial illiterate, there are *approximately 1.7 billion adults* globally who cannot put their financial services access to good use.

FinTech, if rightly designed and applied (e.g. through robo-advisors), could come to these account holders' assistance. However, according to Eurostat, 39% of EU individuals over age 65 did not use the internet once in the three month period

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<sup>55</sup> AFI, "Maya Declaration", online: *AFI* <[www.afi-global.org/global-voice/maya-declaration](http://www.afi-global.org/global-voice/maya-declaration)>; AFI, "Maya Declaration Continues to Evolve" (6 November 2017), online: *AFI* <[www.afi-global.org/news/2017/11/maya-declaration-continues-evolve-financial-inclusion-commitments-66-countries](http://www.afi-global.org/news/2017/11/maya-declaration-continues-evolve-financial-inclusion-commitments-66-countries)>; AFI, "2021 Maya Declaration Progress Report: A Decade-Long Journey" (7 March 2022), online: *AFI* <[www.afi-global.org/publications/2021-maya-declaration-progress-report-a-decade-long-journey](http://www.afi-global.org/publications/2021-maya-declaration-progress-report-a-decade-long-journey)>.

<sup>56</sup> United Nations Secretary General, "Task Force on Digital Financing of Sustainable Development Goals" (29 November 2018), online: *United Nations Secretary General* <[www.un.org/sg/en/content/sg/personnel-appointments/2018-11-29/task-force-digital-financing-sustainable-development](http://www.un.org/sg/en/content/sg/personnel-appointments/2018-11-29/task-force-digital-financing-sustainable-development)>.

<sup>57</sup> *Ibid.*; see also Digital Finacing Task Force, "People's Money: Harnessing Digitization to Finance a Sustainable Future" (August 2020), online: *UNSDG* <<https://unsdg.un.org/resources/peoples-money-harnessing-digitalization-finance-sustainable-future>>.

<sup>58</sup> See Leora Klapper, Annamaria Lusardi & Peter Van Oudheusden, "Financial Literacy Around the World" (2015), online (pdf): *Global Financial Literacy Excellence Center* [https://gflec.org/wp-content/uploads/2015/11/Finlit\\_paper\\_16\\_F2\\_singles.pdf](https://gflec.org/wp-content/uploads/2015/11/Finlit_paper_16_F2_singles.pdf) at 16.

surveyed.<sup>59</sup> Despite many EU initiatives and initiatives of EU member states,<sup>60</sup> an analysis of how legislation, with the help of technology, could respond to financial illiteracy is sorely needed.<sup>61</sup> The UK Financial Conduct Authority estimates that 28% of UK adults aged from 75 to 84 years of age are digitally excluded.<sup>62</sup> At a time where bank branches are being closed, and more bank branches tend to close in poorer quarters than in rich, technological exclusion translates into financial exclusion.

Multiple regulators seek to draw lessons from (and implement) the UN's digital literacy framework<sup>63</sup> – with Kenya's Three-Step-System of (1) gaining familiarity with, (2) using, and (3) creating and programming software, an oft-followed example.<sup>64</sup> But despite all these efforts, digital and financial illiteracy will be with us for the foreseeable future and financial law has to accept widespread illiteracy as a regulatory precondition. In light of this, customer oriented effective FinTech is needed for the Financial Inclusion that is crucial on the journey towards a long-term, sustainable, and prosperous world.

## 4. SUSTAINABILITY

The third and most recent driver of data-driven finance is sustainability. Development has long been the central policy agenda. Prior to 2008, the focus tended to be on economic growth as the most powerful driver, with finance playing an important supporting role. However, over the past several decades, focus has increasingly shifted from economic growth as the central path to development to a more broader focus on sustainable development, increasingly in tandem with climate change objectives.

### (a) Regulatory Approaches to Sustainability

Today, there are three major approaches to sustainability.

<sup>59</sup> Eurostat, "Individuals: Internet Use" (30 March 2022), online: *Eurostat Data Browser* <[https://ec.europa.eu/eurostat/databrowser/view/ISOC\\_CI\\_IFP\\_IU\\_\\_custom\\_915519/default/table?lang=en&bookmarkId=1a84d7ea-0d93-40ff-a7c0-b3b3cfd62e3](https://ec.europa.eu/eurostat/databrowser/view/ISOC_CI_IFP_IU__custom_915519/default/table?lang=en&bookmarkId=1a84d7ea-0d93-40ff-a7c0-b3b3cfd62e3)>.

<sup>60</sup> See the overview on the European Commission's online platform for adult learning: European Commission, "Financial Literacy" online: *European Commission* <[https://finance.ec.europa.eu/consumer-finance-and-payments/financial-literacy\\_en](https://finance.ec.europa.eu/consumer-finance-and-payments/financial-literacy_en)>.

<sup>61</sup> See the recent proposal by Safeguarding Ireland, "Identifying Risks, Sharing Responsibilities: The Case for a Comprehensive Approach to Safeguarding Vulnerable Adults" (May 2022), online (pdf): *Safeguarding Ireland* <[www.safeguardingireland.org/wp-content/uploads/2022/05/6439-Safeguarding-Risks-Resp-Report-FA4\\_lowres.pdf](http://www.safeguardingireland.org/wp-content/uploads/2022/05/6439-Safeguarding-Risks-Resp-Report-FA4_lowres.pdf)>.

<sup>62</sup> Financial Conduct Authority, "Financial Lives 2020 Survey; The Impact of Coronavirus" (11 February 2021), online: *Financial Conduct Authority* <[www.fca.org.uk/publications/research/financial-lives-2020-survey-impact-coronavirus](http://www.fca.org.uk/publications/research/financial-lives-2020-survey-impact-coronavirus)> at 197.

<sup>63</sup> United Nations Educational, Scientific and Cultural Organisation (UNESCO), *A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2*, Information Paper No 51, UIS/2018/ICT/IP/51 (June 2018) online: <<http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf>>.

<sup>64</sup> See Kenya News, "Kenyans Urged to Support the Digital Literacy Programme" (8 March 2022), online: *KenyaNews* <[www.kenyanews.go.ke/kenyans-urged-to-support-the-digital-literacy-programme/#:~:text=The%20Digital%20Literacy%20programme%20which,of%20DLP%20devices%20to%20schools.>](http://www.kenyanews.go.ke/kenyans-urged-to-support-the-digital-literacy-programme/#:~:text=The%20Digital%20Literacy%20programme%20which,of%20DLP%20devices%20to%20schools.>)>.



The first approach views climate change as well as the other UN SDGs from the standpoint of the traditional financial services focus on risk and related disclosure and particularly centers around environmental, social and corporate governance (ESG). Going forward, using the UN SDGs as the core framework for defining, monitoring and evaluating ESG investment has great potential to redirect existing resources towards achieving the SDGs.

The second approach views the UN SDGs (particularly climate change including in the Paris Agreement context, biodiversity and poverty reduction) as relating to new sources of potential risk. For example, climate change is now identified by the global insurance industry as perhaps the greatest risk facing the industry going forward.<sup>65</sup> This leads to policy changes and significant research into risk modelling, management, and mitigation, all resulting in substantial redirection of resources to support the SDGs.

The third approach involves thinking about how to restructure or even redesign the financial system, thereby transforming finance to support the UN SDGs.<sup>66</sup> This third approach lies at the heart of the sustainable finance initiatives currently being developed in many places, but most prominently in the EU with its Sustainable Finance Action Plan (SFAP) of 2018 and successor strategies.<sup>67</sup>

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<sup>65</sup> See McKinsey & Company, “Climate Change and P&C Insurance: The Threat and Opportunity” (November 2020), online: *McKinsey & Company* <[www.mckinsey.com/industries/financial-services/our-insights/climate-change-and-p-and-c-insurance-the-threat-and-opportunity](http://www.mckinsey.com/industries/financial-services/our-insights/climate-change-and-p-and-c-insurance-the-threat-and-opportunity)>; see also McKinsey & Company, “How Insurance can Help Combat Climate Change” (6 January 2011), online (podcast): *McKinsey & Company* <[www.mckinsey.com/industries/financial-services/our-insights/how-insurance-can-help-combat-climate-change](http://www.mckinsey.com/industries/financial-services/our-insights/how-insurance-can-help-combat-climate-change)>; see also Claude Bernard Lontchi, Baochen Yang & Yunpeng Su, “The Mediating Effect of Financial Literacy and the Moderating Role of Social Capital in the Relationship between Financial Inclusion and Sustainable Development in Cameroon” (2022) 14 *Sustainability* 15093.

<sup>66</sup> See Dirk A Zetzsche, Ross P Buckley & Douglas W Arner, “FinTech for Financial Inclusion: Driving Sustainable Growth” in Julia Walker, Alma Pekmezovic & Gordon Walker (eds), *Sustainable Development Goals: Harnessing Business to Achieve the SDG’s through Finance, Technology and Law Reform* (Wiley, 2019) at 179; Douglas W Arner et al, “Sustainability, FinTech and Financial Inclusion” (2020) 21:1 *European Business Organization L Rev* 7.

<sup>67</sup> See, for an overview, Dirk A Zetzsche & Linn Anker-Sørensen, “Regulating Sustainable Finance in the Dark” (2022) 23 *European Business Organization L Rev* 47; see also Principles for Responsible Investment (PRI), “The European Commission Action Plan: Financing Sustainable Growth, Assessment of the Reform Areas for PRI Signatories” (July 2018), online (pdf): *PRI* <[www.unpri.org/download?ac=5173](http://www.unpri.org/download?ac=5173)>; for details about the implementation and successors of the SFAP up to 2020, see European Commission, “Renewed Sustainable Finance Strategy and Implementation of the Action Plan on Financing Sustainable Growth” (5 August 2020), online: *European Commission* [https://finance.ec.europa.eu/publications/renewed-sustainable-finance-strategy-and-implementation-action-plan-financing-sustainable-growth\\_en](https://finance.ec.europa.eu/publications/renewed-sustainable-finance-strategy-and-implementation-action-plan-financing-sustainable-growth_en); in 2021, EU further published strategy and proposals for Financing the Transition to a Sustainable Economy, see Matthew Townsend & Gauthier van Thuyne, “Strategy for Financing the Transition to a Sustainable Economy Published” (6 July 2021), online: *Allen & Overy* <[www.allenoverly.com/en-gb/global/news-and-insights/publications/strategy-for-financing-the-transition-to-a-sustainable-economy-published](http://www.allenoverly.com/en-gb/global/news-and-insights/publications/strategy-for-financing-the-transition-to-a-sustainable-economy-published)> and Rebecca Perlman, “EU’s Sustainable Finance Action Plan Takes Shape: New Proposals for Climate Reporting and Green Investments” (11 May 2021), online: *Herbert Smith Freehills* <[www.herbertsmithfreehills.com/insight/eus-sustainable-finance-action-plan-takes-shape-new-proposals-for-climate-reporting-and](http://www.herbertsmithfreehills.com/insight/eus-sustainable-finance-action-plan-takes-shape-new-proposals-for-climate-reporting-and)>.

### **(b) Sustainability as a Driver of Datafication**

Each of these three regulatory approaches propels the datafication of finance. All approaches focus upon ESG and the UN SDGs as risk indicators and thus require data collection and analytics, in addition to traditional financial analysis. This is most obvious with regard to the “double materiality” standard implemented in the EU SFAP, which requires firms to report on both how sustainability issues affect their business and their own impact on people and the environment.<sup>68</sup>

The number of data sets necessary for meeting the regulatory requirements in the EU exceed what can be processed manually. For instance, Annex I of the Sustainable Finance Disclosures Delegated Regulation (EU) 2022/1288 of 6 April 2022 lists more than 30 environmental and social factors that require reporting. This data needs to be collected for each “economic activity”, defined narrowly, for each firm, and each “sector” in which the firm is active, ranging from manufacturing to construction, consulting to sales. The data collection is challenging as the data sources are often external – even the most sustainability-oriented firms do not have access to all data necessary for meeting the regulatory requirements. In turn, complying with the EU SFAP requires, on the firm level, the creation of entirely new data sources and data sets, analytic models, and reporting standards and systems. None of this can be achieved without datafication and advanced IT-driven analytics.<sup>69</sup>

### **(c) Datafication as a Driver of Sustainability**

To the same extent that sustainability drives datafication, datafication drives sustainability.

Digital finance and FinTech play three core roles in achieving the SDGs.

The first is enhancing the allocation of existing financial resources by redirecting those resources globally and in individual countries to provide SDG-related finance. Examples include ESG and green investment strategies and the rapid growth in ESG-related financing in the EU, China and Japan.<sup>70</sup>

The second involves the expansion of resources in the financial system generally which can in turn support the SDGs. This takes place through financial inclusion and financial sector development, which together can increase the amount of financial resources available.

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<sup>68</sup> European Commission, “Questions and Answers: Corporate Sustainability Reporting Directive Proposal” (21 April 2021), online: *European Commission* <[https://ec.europa.eu/commission/presscorner/detail/en/QANDA\\_21\\_1806](https://ec.europa.eu/commission/presscorner/detail/en/QANDA_21_1806)>.

<sup>69</sup> For a description of the complexities of the Sustainable Finance Action Plan, see Dirk A Zetzsche & Linn Anker-Sørensen, “Regulating Sustainable Finance in the Dark” (2022) 23 *European Business Organization L Rev* 47.

<sup>70</sup> Also see Organisation for Economic Co-operation and Development (OECD), *ESG Investing and Climate Transition: Market Practices, Issues and Policy Considerations* (OECD: Paris, 2021) online (pdf): [www.oecd.org/finance/ESG-investing-and-climate-transition-market-practices-issues-and-policy-considerations.pdf](https://www.oecd.org/finance/ESG-investing-and-climate-transition-market-practices-issues-and-policy-considerations.pdf); and R Boffo & R Patalano, *ESG Investing: Practices, Progress and Challenges* (OECD: Paris, 2021) online (pdf) <[www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf](https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf)>.

The third involves the use of digital finance and FinTech to directly achieve the SDGs themselves. This occurs through the use of new technologies and regulatory technology (RegTech) to design better financial and regulatory systems to achieve policy objectives.

Table 1 presents how FinTech can contribute directly or indirectly to the UN SDGs.

Table 1: How FT4FI could further the UN SDGs<sup>71</sup>

No.	Goals	Impact Direct=D Indirect=I	How FT4FI Can Further Goal
1	No poverty	I	Allow for online financing, including credit and crowdfunding; create new income opportunities through online markets and payments; reduce impact of disasters, enable more longer-term thinking and planning
2	Zero hunger	I	Enhance financial stability; stabilise cash-flows through saving and lending
3	Good health and well-being	I	Provide health insurance and financial stability
4	Quality education	I	Enable saving for school fees
5	Gender equality	D	Strengthen female entrepreneurship and financial control
6	Clean water and sanitation	I	Provide financing for development and maintenance of infrastructure; further education for local sustainability expertise
7	Affordable and clean energy	I	Ibid
8	Decent work and economic growth	D	Allow for online financing, including credit and crowdfunding; create new (online) income opportunities; ensure funding and use symmetry (long-term finance for long-term projects, short-term finance for short-term projects)
9	Industry, innovation and infrastructure	D	Provide financing for development and maintenance of infrastructure
10	Reduced inequalities	D	See on gender at UN SDG 5. Education and savings provide the best opportunity for greater participation in most societies; with both furthered by FT4FI
11	Sustainable cities and communities	I	FT4FI assists the development of and investment in sustainable technology and transformation
12	Responsible production and consumption	I	Ibid

<sup>71</sup> The Table draws on the authors' own research and experience. That digital financial services support the UN SDGs is very broadly accepted: see UNCDF, "Digital Finance and the SDGs" <[www.uncdf.org/mm4p/dfs-and-the-sdgs](http://www.uncdf.org/mm4p/dfs-and-the-sdgs)>.

13	Climate action	I	Ibid
14	Life below water	I	Ibid
15	Life on land	I	Ibid
16	Peace, justice and strong institutions	I	Robust economic development strengthens peace and civil institutions
17	Partnerships	D	FT4FI allows for engagement of private actors, multiplying assistance by public or state supported actors

If financial markets are sufficiently mature, financial services supporting financial inclusion can contribute to *all* 17 UN SDGs. Financial inclusion through FinTech is thus perhaps *the most important* intermediate step economies should take on their journey to achieving the UN SDGs.

## 5. THE INTERRELATION BETWEEN EFFICIENCY, SUSTAINABILITY AND INCLUSION

This section argues that all three drivers of change together must be present to achieve a well-balanced datafied financial system. We first argue that financial inclusion and sustainability are two sides of the same coin, before showing the relationship between efficiency and both sustainability and financial inclusion.

### (a) Financial Inclusion and Sustainability: Two Sides of the Same Coin

Financially excluded individuals lack tools to prepare for and manage the burden of life's challenges, including sickness, crime, poverty, etc. For instance, farmers without access to electronic payment systems worry about theft, and may consume more immediately rather than risk saving. Yet saving can fund children's education and provide for old age. Financial exclusion takes from people the opportunity to think, plan and *act* long-term. Risks that can be avoided, hedged, or socialized through the financial system can materialize at any time, yet financial exclusion forces the excluded to think and act *short-term*, often unsustainably and inefficiently. Financial inclusion and sustainability are two sides of the same coin, with both aimed at the UN SDG's core objective of promoting prosperity while balancing risks.<sup>72</sup>

While financial inclusion is not a UN SDG *per se*, it facilitates achievement of all the SDGs and therefore should be seen as a key underlying objective in seeking balanced, long-term and sustainable development (see Table 1).

<sup>72</sup> Douglas W Arner et al, "Sustainability, FinTech and Financial Inclusion" (2020) 21:1 European Bus Organisation L Rev 7–35; see also McKinsey & Company, "Financial Inclusion and Sustainable, Inclusive Growth in Action" (19 May 2022) online (podcast): *McKinsey & Company* <[www.mckinsey.com/featured-insights/sustainable-inclusive-growth/future-of-america/financial-inclusion-and-sustainable-inclusive-growth-in-action](https://www.mckinsey.com/featured-insights/sustainable-inclusive-growth/future-of-america/financial-inclusion-and-sustainable-inclusive-growth-in-action)>.

## (b) Efficiency versus Sustainability and Financial Inclusion: An Imperative Link

Although often overlooked, there is an inherent link between efficiency, financial inclusion, and sustainability agendas: “In a world where for the most part pension funds and other intermediaries serving retail beneficiaries provide the funding, only a *profitable* market-based sustainability strategy is truly sustainable.”<sup>73</sup>

This is so for four reasons. First, the sustainable transformation of the world’s economy is costly. It requires development of more sustainable products and services as substitutes for less sustainable ones. This, in turn, requires investments in research and development (R&D). Only profitable or potentially profitable firms will be able to finance these R&D expenses, regardless of whether they use retained earnings or projected future earnings (i.e., capital provided by investors) to finance R&D.<sup>74</sup>

Second, unprofitable firms have a strong incentive to misreport their sustainability position to justify lesser financial performance.<sup>75</sup> Unprofitability thus undermines the readiness to comply with stricter ESG requirements.

Third, the link between profitability and sustainability is to date uncertain. Despite high general interest in ESG-based investing, the sustainability agenda suffers from a lack of understanding and empirical data about sustainable investments needed to guide investor behaviour.<sup>76</sup> Every truly profitable *and* truly sustainable firm enhances investors’ trust that the sustainable transformation of financial markets is possible.<sup>77</sup>

Finally, the more money in the financial system, the faster it can finance any

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<sup>73</sup> Dirk A Zetzsche & Linn Anker-Sørensen, “Regulating Sustainable Finance in the Dark” (2022) 23 European Bus Organization L Rev 47 at 80 (emphasis in original).

<sup>74</sup> It was observed that in the prolonged recession after the 2008 Global Financial Crisis, firms with revenues over \$100 million reduced their R&D intensity (measured as a percentage of total revenue) by 5.6% on average, whereas their capital intensity fell only 4.8% and advertising intensity actually increased 3.4%. See Anne Marie Knott, “The Trillion-Dollar R&D Fix” (May 2012), online: *Harvard Business Review* <<https://hbr.org/2012/05/the-trillion-dollar-rd-fix>>.

<sup>75</sup> Ryan Flugum & Matthew Souther found that managers often emphasize their ESG focus when they underperform earnings expectations but make far fewer public statements related to ESG when they meet earning expectations. See Sanjai Bhagat, “An Inconvenient Truth about ESG Investing” (31 March 2022), online: *Harvard Business Review* <<https://hbr.org/2022/03/an-inconvenient-truth-about-esg-investing?registration=success>>; see also Ryan Flugum & Matthew E Souther, “Stakeholder Value: A Convenient Excuse for Underperforming Managers?” (13 September 2022) online: *Social Science Research Network* <<https://ssrn.com/abstract=3725828>>.

<sup>76</sup> See Zetzche & Anker-Sørensen, *supra* note 74 at 669.

<sup>77</sup> For example, Google, which recorded a revenue of US\$256.7 billion in 2021, boasts that it has been carbon neutral since 2007 and will be entirely carbon free by 2030. Google plans to achieve its carbon neutral goal by running its data centers and campuses entirely on carbon-free energy, optimizing Google Search to answer questions about climate change with authoritative information from sources like the United Nations and respectable news sources to raise customers awareness of climate change, and reforming supply chain and manufacturing process to lower carbon footprints. See Mike Huynh, “Big Profitable Companies That are Becoming the Unlikeliest Green Leaders” (26 May 2022), online: *The CEO Magazine* <[www.theceomagazine.com/business/management-leadership/green-companies](http://www.theceomagazine.com/business/management-leadership/green-companies)>.

transformation. Higher firm profitability in the real economy generally attracts more capital to shift from financing the financial economy to financing the real economy. What is true in general, is particularly true for the sustainability transformation.

Hence, the cost savings and efficiency gains that datafication and technology may provide are very welcome. The profits generated this way may well be used to finance the sustainability transformation. A large-scale, long-term unprofitable sustainable investment is in itself unsustainable in a business sense.

Furthermore, efficiency is informed by sustainability and financial inclusion perspectives. Where datafied technology negatively impacts financial inclusion and sustainability, it will prompt policy reactions. For instance, as part of the European Commission's Revised Sustainable Finance Agenda from July 2021,<sup>78</sup> the energy use of Bitcoin's blockchain is receiving great focus, making a restrictive regulatory response very likely. The same regulatory interference may well be seen in response to the exclusive effects of credit scoring<sup>79</sup> and taxi allocation algorithms,<sup>80</sup> with the EU's draft artificial intelligence regulation<sup>81</sup> providing a noteworthy example. In turn, a large, cost efficient yet financially exclusive or unsustainable investment is as doomed to fail as a large-scale, long-term unprofitable sustainable investment.

Efficiency, financial inclusion, and sustainability are thus inherently intertwined.

## 6. CONCLUSION

As we have argued, the quest for efficiency, financial inclusion, and sustainability have driven the development of FinTech and datafication of financial services. None of these three factors alone will propel FinTech and datafication in the future. While efficiency gains originally drove FinTech, today the trifecta of efficiency, financial inclusion, and sustainability together best explain the steps financial institutions are currently taking to datafy their economic activities.

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<sup>78</sup> EC, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Strategy for Financing the Transition to a Sustainable Economy* [2021] COM (2021) 390 at 8 online: <[https://eur-lex.europa.eu/resource.html?uri=cellar:9f5e7e95-df06-11eb-895a-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:9f5e7e95-df06-11eb-895a-01aa75ed71a1.0001.02/DOC_1&format=PDF)>.

<sup>79</sup> See European Commission, "About This Initiative" (2022), online: *Sustainable Finance – Environmental, Social and Governance Ratings and Sustainability Risks in Credit Ratings* <[https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13330-Sustainable-finance-environmental-social-and-governance-ratings-and-sustainability-risks-in-credit-ratings\\_en](https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13330-Sustainable-finance-environmental-social-and-governance-ratings-and-sustainability-risks-in-credit-ratings_en)>.

<sup>80</sup> See European Commission, "European Commission Adopts New Initiatives for Sustainable and Smart Mobility" (2 February 2022), online: *Mobility and Transport* <[https://transport.ec.europa.eu/news/european-commission-adopts-new-initiatives-sustainable-and-smart-mobility-2022-02-02\\_en](https://transport.ec.europa.eu/news/european-commission-adopts-new-initiatives-sustainable-and-smart-mobility-2022-02-02_en)>.

<sup>81</sup> EC, *Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts* [2021] COM 2021/206 online: <<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206>>.