



Faculty of Law,
Economics
and Finance

Law Working Paper Series
Paper number 2019-006

Sustainability, FinTech and Financial Inclusion

Ross P. Buckley, University of New South Wales
ross.buckley@unsw.edu.au

Douglas W. Arner, University of Hongkong
douglas.arnier@hku.hk

Dirk A. Zetsche, University of Luxembourg
Dirk.Zetsche@uni.lu

Robin Veidt, University of Luxembourg
Robin.Veidt@uni.lu

13/05/2019

Sustainability, FinTech and Financial Inclusion

Douglas W. Arner,¹ Ross P. Buckley,² Dirk A. Zetsche³ and Robin Veidt⁴

We argue financial technology (FinTech) is the key driver for financial inclusion, which in turn underlies sustainable balanced development, as embodied in the UN Sustainable Development Goals (SDGs). The full potential of FinTech to support the SDGs may be realized with a progressive approach to the development of underlying infrastructure to support digital financial transformation. Our research suggests that the best way to think about such a strategy is to focus on four primary pillars. The first pillar requires the building of digital identity, simplified account opening and e-KYC systems, supported by the second pillar of open interoperable electronic payments systems. The third pillar involves using the infrastructure of the first and second pillars to underpin electronic provision of government services and payments. The fourth pillar – design of digital financial markets and systems – supports broader access to finance and investment. Implementing the four pillars is a major journey for any economy, but one which has tremendous potential to transform not only finance but economies and societies, through FinTech, financial inclusion and sustainable balanced development.

¹ Kerry Holdings Professor in Law and Director, Asian Institute of International Financial Law, Faculty of Law, University of Hong Kong.

² KPMG Law -- King & Wood Mallesons Professor of Disruptive Innovation, and Scientia Professor, UNSW Sydney.

³ Professor of Law, ADA Chair in Financial Law (Inclusive Finance), Faculty of Law, Economics and Finance, University of Luxembourg, and Director, Centre for Business and Corporate Law, Heinrich-Heine-University, Düsseldorf, Germany.

⁴ Research Associate, ADA Chair in Financial Law (Inclusive Finance), Faculty of Law, Economics and Finance, University of Luxembourg.

We are grateful for the financial support for this research provided by the Alliance for Financial Inclusion (AFI); the Australian Research Council; the Hong Kong Research Grants Council; and the Qatar National Research Fund. All responsibility is the authors'. This article draws upon our earlier, extended report for AFI: "FinTech for Financial Inclusion: A Framework for Digital Financial Transformation", Sep. 2018; available at <https://www.afi-global.org/publications/2844/FinTech-for-Financial-Inclusion-A-Framework-for-Digital-Financial-Transformation>.

Contents

<i>Sustainability, FinTech and Financial Inclusion</i>	1
I. Introduction	3
II. Financial Inclusion and Sustainability: The Long-term Perspective	8
A. Financial Inclusion: Why It Matters.....	8
B. Two Sides of the Same Coin.....	8
C. Financial Inclusion: A Developing Country Topic?	10
III. FinTech, Financial Inclusion and Sustainability	11
A. FinTech and Financial Inclusion	12
B. FinTech and Sustainability	13
III. Sustainability through FinTech and Financial Inclusion: Four Pillars of Digital Financial Transformation	15
Pillar I: Digital ID and eKYC – Establishing the Foundation	16
Pillar II: Open, Interoperable Electronic Payment Systems – Building Connectivity	17
1. Mobile Money.....	18
2. Designing Regulatory Infrastructure for an Open Electronic Payments System.....	18
Pillar III: Electronic Government Provision of Services – Expanding Usage	19
1. Electronic Payment: Government Salaries and Transfers	20
2. Electronic Payment and Provision: Other Core Services	21
Pillar IV: Design of Financial Market Infrastructure and Systems – Enabling New Activities, Business and Wider Development	21
1. Transforming Credit Provision: From Collateral and Microfinance to Cash-flow	21
2. Adding Insurance and Investments to Savings and Credit	22
3. Building Better Financial Infrastructure	22
IV. Developing a Comprehensive Strategy	22
A. Strategic Approach.....	22
B. The Challenge of Technology	22
C. Building Innovation Ecosystems: Regulatory Sandboxes, Piloting and Test-and-Learn Approaches, AND: RegTech	23
D. Balancing Inclusion with Client Protection.....	23
V. Towards Inclusive and Balanced Sustainable Growth	24

I. Introduction

Sustainable development is one of the most important shared objectives globally. In looking at this issue, the focus today increasingly centres on the United Nations Sustainable Development Goals (UN SDGs), with the UN SDGs providing a framework of detailed objectives and criteria in pursuing sustainable development.

Central banks and financial regulators around the world are likewise considering how they can enhance sustainable development and the UN SDGs in the context of their wider mandates for financial and economic development. Central banks and financial regulators however have to also balance their other objectives, including monetary stability, financial stability, financial integrity and consumer protection with these developmental objectives.

Today, there are three major approaches emerging among financial regulatory policymakers to sustainability and the UN SDGs.

The first approach views climate change and the other UN SDGs from the standpoint of the traditional financial services focus on risk and related disclosure: as an example, the Financial Stability Board has led the development of a new set of climate change related disclosures. Similar frameworks are being adopted by others, particularly 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 but also biodiversity and poverty reduction) as relating to new sources of potential risk which must be addressed: for example, climate change is now identified by the global insurance industry, its major regulators and related international regulatory organizations (such as the International Association of Insurance Supervisors) as perhaps the greatest risk facing the industry going forward. This is resulting in policy and regulatory changes and significant research into risk modelling, management and mitigation, all resulting in substantial redirection of resources to support the SDGs. InsurTech is a particular focus of R&D efforts. Likewise, the core focus of the Financial Stability Board is identifying new risks, thus providing a potentially significant opportunity for policy and regulatory focus.

The third approach – which is in its very early stages – involves thinking about how to restructure or even redesign the financial system to support the UN SDGs. This is the focus of this article: How can we support the transformation of finance to support the UN SDGs? In answering this question we turn to two other leading foci for central banks and financial regulators: financial inclusion and financial technology.

As the increasing focus on sustainability and the UN SDGs has emerged, so has a related focus on financial inclusion, bringing finance to all parts of societies in order to maximise benefits. Financial inclusion focuses on sustainable balanced development: making sure that the benefits extend to all.

In addition, over the past decade, central banks and financial regulators have had to face yet another challenge: the digital transformation of finance and financial systems around the world. Financial technology or FinTech brings with it not only major opportunities to transform finance positively but also major new risks which potentially impact regulatory objectives.

Sustainable Finance and **FinTech** are now major policy focuses of most national governments and regulators, as demonstrated by (1) a range of initiatives promoted by the European Commission⁵ and some of the EU Member States,⁶ and (2) an abundant stream of research on both sustainability⁷ and FinTech.⁸ Yet few have linked the two fields. In particular, the European Commission's Sustainable Finance Action Plan is silent on FinTech.

This article undertakes to link the two topics, using the third as catalyst: **Financial Inclusion**. Similar to sustainable finance and FinTech, financial inclusion is at the centre of current global policy attention, driven e.g. by the G20,⁹ the World Bank¹⁰ and major development organizations.¹¹

Thus, in seeking to redesign finance to support sustainability through the UN SDGs, we focus on one significant avenue: digital financial transformation in support of financial inclusion and financial development. Strategies focusing on digital financial transformation support financial inclusion, the generation of new financial resources and the direct achievement of

⁵ See on **FinTech** European Commission (2018), *FinTech Action plan: For a more competitive and innovative European financial sector*, COM(2018) 109/2, https://ec.europa.eu/info/publications/180308-action-plan-fintech_en. On **sustainable finance** see European Commission, *Action Plan: Financing Sustainable Growth*, COM/2018/097 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0097>.

⁶ Re sustainable finance, most notably, the Grand Duchy of Luxembourg has launched a Green Finance initiative, inspired by the ambition to claim market leadership in Green Finance financial products. Other prominent EU examples include the sustainability agendas of France, the Netherlands and Germany, which seek to steer capital flows into sustainable financial products.

⁷ Instead of many, see eg. Delimatsis, P. (2016). *Sustainable standard-setting, climate change and the TBT Agreement*, in *Research handbook on climate change and trade law*, 148-180, Edward Elgar (arguing that 'a mushrooming of a new generation of private standard-setters at the transnational level.'). In return, the European Commission has started work on an own taxonomy, see European Commission, *Action Plan: Financing Sustainable Growth*, COM/2018/097 final, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018DC0097>, work programme in Annex II and III.; see also Schanzenbach, M.M., & Sitkoff, R.H. (2019), *Reconciling Fiduciary Duty and Social Conscience: The Law and Economics of ESG Investing by a Trustee*, Stanford Law Review, *in press*, Northwestern Law & Econ Research Paper No. 18-22, <https://ssrn.com/abstract=3244665> (arguing that ESG investing is only possible for trusts if the trustee reasonably concludes and solely acts because of the fact that the ESG investment will be directly beneficial for the beneficiary by improving risk-adjusted return); Sjaafjell, B., & Bruner, C.M. (eds., 2019), *Cambridge Handbook of Corporate Law, Corporate Governance and Sustainability*, Cambridge University Press, *in press* (the contributions in the edited volume discuss the mismatch between global markets and territorially rooted national sustainability regulation).

⁸ Instead of many, including our own, legal work, we refer to some key economic research, including Biais, B., Bisière, C., Bouvard, M., & Casamatta, C. (2019), *The Blockchain Folk Theorem*, 32:5 *Rev. Fin. St.* 1662-1715 (analysing economics of Blockchain technology); Hornuf, L., & Schwienbacher, A. (2017), *Market Mechanisms and Funding Dynamics in Equity Crowdfunding*, 50 *J. Corporate Fin.* 556-574; Buchak, G., Matvos, G., Piskoski, T., & Seru, A. (2018), *Fintech, Regulatory Arbitrage, and the Rise of Shadow Banks*, 130:3 *Journal of Financial Economics* 453-483 (measuring the impact of technologies); Bacache, M., Bloch F. et al. (2015), *Taxation and the digital economy: A survey of theoretical models*, https://www.strategie.gouv.fr/sites/strategie.gouv.fr/files/atoms/files/ficalite_du_numerique_10_mars_corrige_fi nal.pdf (as example for related topics such as taxation of the digital economy).

⁹ Global Partnership for Financial Inclusion (GPII) (2016), *G20 High-Level Principles For Digital Financial Inclusion*.

¹⁰ See The World Bank's financial inclusion policy work at <https://www.worldbank.org/en/topic/financialinclusion>.

¹¹ Including the International Monetary Fund, the OECD, and others, NGOs such as the Alliance for Financial Inclusion, The Toronto Centre, and Microfinance Centre, as well as the state-sponsored development banks (EIB, ADB, IDB, FDIC, etc.).

the SDGs, for instance through a combination of digital identification systems, simplified account opening processes, interoperable electronic payment systems, and government-to-citizen services delivered through this core financial infrastructure. The new Central Banks and Bank Supervisors Network for Greening of the Financial System and the new Sustainability Committee of the International Organization of Securities Commissions are examples of initiatives which seek to combine various policy approaches to support digital financing of the SDGs, while the Alliance for Financial Inclusion's FinTech for Financial Inclusion (FinTech4FI) initiative shows the potential for strategies for digital financial transformation.

Why focus on financial inclusion? We have good reasons to do so: As of 2017, 1.7 billion adults lacked access to a financial or mobile money account, some 31 percent of the world's population.¹² Significantly, though, between 2010 and 2017, 1.2 billion people gained a financial or mobile money account for the first time, with most located in developing countries.¹³ Much of this progress came from the impact of technology in finance. For example, mobile money has played a major role in increasing financial inclusion in Kenya and East Africa.¹⁴ China has moved in a very short period of time from an inefficient traditional financial system to perhaps the world's most digitized financial system.¹⁵ India has dramatically increased financial access by building the infrastructure for a new digital economy ("India Stack"), thereby leading to hundreds of millions people gaining accounts.¹⁶ Along with similar developments in Russia, these four places account for the vast majority of the gains in financial inclusion since 2010.

From the legal perspective, linking sustainability, FinTech and financial inclusion is far from obvious. In fact, most research has focused on the three fields as separate, unrelated silos of knowledge. Financial inclusion has become an economic research topic¹⁷ – with a focus in microfinance¹⁸ – but, with few exceptions,¹⁹ much less a legal one. Where legal scholars

¹² Demircug-Kunt, Klapper, Singer, Ansar & Hess, *The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution*, World Bank (Apr. 2018).

¹³ See The World Bank, *The Global Findex Database 2017*, <https://globalfindex.worldbank.org/>.

¹⁴ Pasti, *Mobile Money as a Driver of Financial Inclusion in Sub-Saharan Africa*, GSMA (June 7, 2017) <https://www.gsma.com/mobilefordevelopment/programme/mobile-money/mobile-money-driver-financial-inclusion-sub-saharan-africa/>; A. Beyene Fanta et al., *The Role of Mobile Money in Financial Inclusion in the SADC Region* (Policy Research Paper No. 03/2016, FinMark Trust) available at <https://www.finmark.org.za/wp-content/uploads/2016/12/mobile-money-and-financial-inclusion-in-sadc.pdf>.

¹⁵ Chien, *Key Lessons for Policymakers from China's Financial Inclusion Experience*, World Bank (Feb. 15, 2018) <http://blogs.worldbank.org/psd/key-lessons-policymakers-china-s-financial-inclusion-experience>; see also W. Zhou, D. Arner & R. Buckley, *Regulation of Digital Financial Services in China: Last Mover Advantage* (2015) 8(1) *Tsinghua China Law Review* 25.

¹⁶ See on the India Stack <https://indiastack.org/>. For a detailed discussion, see Arner, D.W., Zetsche, D.A., Buckley, R.P., & Barberis, J. (2019), *The Identity Challenge in Finance: From Analogue Identity to Digitized Identification to Digital KYC Utilities*, 20:1 *European Business Organization Law Review* 55, 64 ff.

¹⁷ See eg. Lal, R., & Sachdev, I. (2015), *Mobile Money Services—Design and Development for Financial Inclusion*, Harvard Business School Working Paper, No. 15-083, http://www.hbs.edu/faculty/Publication%20Files/15-083_e7db671b-12b2-47e7-9692-31808ee92bf1.pdf.

¹⁸ See eg. with regard to technology Ashta, A. (2010), *Advanced Technologies for Microfinance: Solutions and Challenges*, IGI Global.

¹⁹ See eg. Barr, M.S. (2004), *Microfinance and Financial Development*, 26 *Mich. J. Intern'l L.* 271-296; Barr, M.S. (2004), *Banking the Poor*, 21 *Yale J. Reg.* 121-237 (2017); Barr, M.S. (2012), *No Slack: The Financial Lives of Low-Income Americans*, Brookings Press; Lee, E., *Financial Inclusion: A Challenge to the New Paradigm of Financial Technology, Regulatory Technology and Anti-Money Laundering Law*, 6 *J. Bus. L.* 473-

focus on financial inclusion, they have studied (1) bank access for underprivileged people in developed societies,²⁰ (2) the regulatory set-up of mobile money service providers,²¹ (3) regulatory preconditions for microfinance institutions,²² and (4) – most recently – the Central Bank’s role in financial inclusion.²³ We also note a scarcity of legal work relating to sustainable finance: While a plethora of studies discuss sustainable finance in general, and some research has been devoted to the steering effect of the UN SDGs,²⁴ with the exception of the impact of climate change on financial institutions²⁵ few academics have studied the link between law and sustainable finance. A lot of attention (including our own²⁶) has been

498, as well as the contributions in Barr, M.S., Kumar, A., & Litan, R. (eds.) (2007), *Building Inclusive Financial Systems – A Framework for Financial Access*, Brookings Press.

²⁰ See in particular Barr, M.S. (2012), *No Slack: The Financial Lives of Low-Income Americans*, Brookings Press, and the contributions in Barr, M.S., Kumar, A., Litan, R. (eds.), *Building Inclusive Financial Systems*, Brookings Press (2007), and Barr, M.S., & Blank, R. (2009), *Insufficient Funds: Savings, Assets, Credit and Banking among Low- and Moderate-Income Households*.

²¹ See eg. Buckley, R., Greenacre, J., & Malady, L. (2015), *The Regulation of Mobile Money in Malawi*, 14 Wash. U. Global Stud. L. Rev. 435; de Koker, L., Singh, S., & Capal, J. (2017), *Closure of Bank Accounts of Remittance Service Providers – Global Challenges and Community Perspectives in Australia*, 36:1 U. Queensland L. J. 119 -154; Lal, R., & Sachdev, I. (2015), *Mobile Money Services - Design and Development for Financial Inclusion*, Harvard Business School Working Paper 15-083, https://www.hbs.edu/faculty/Publication%20Files/15-083_e7db671b-12b2-47e7-9692-31808ee92bf1.pdf; Winn, J. (2016), *Mobile Payments and Financial Inclusion: Kenya, Brazil, and India as Case Studies*, in Rothchild, J.A. (ed.), *Research Handbook on Electronic Commerce Law*, 62-90, Edward Elgar; Zhou, W., Arner, D.W., & Buckley, R.P. (2015), *Regulation of Digital Financial Services in China: Last Mover Advantage*, 8:1 Tsinghua China Law Review 25-62.

²² See Basel Committee for Banking Supervision (BCBS) (2010), *Microfinance Activities and the Core Principles for Effective Banking Supervision*, Basel, Switzerland; Trujillo, V., Rodríguez, F., & Muriel, V. (2014), *Microfinance Regulation and Market Development in Latin America*, 14:4 B.E. Journal of Economic Analysis and Policy 1615–44; and Trujillo, V. et al. (2015), *How is microfinance being regulated in Latin America?*, 26:4 Enterprise Development and Microfinance 344-347; Rosengard, J.K. (2011), *Oversight is a many-splendored thing: choice and proportionality in regulating and supervising microfinance institutions*, in Armendariz, B., & Labie, M. (eds), *The Handbook of Microfinance*, 159-171, World Scientific.

²³ See Harris, A., & Barr, M.S. (2019), *Central Bank of the Future*, U of Michigan Public Law Research Paper No. 1, July 2019, <https://ssrn.com/abstract=3422860>.

²⁴ See Biermann, F. (2019), *A new paradigm for global sustainability governance: Inside look from the trenches of the SDGs negotiation arena*, 20:1 GAIA-Ecological Perspectives for Science and Society 52-53; Kanie, N., & Biermann, F. (2017), *Governing through Goals – Sustainable Development Goals as Governance Innovation*, MIT press (with contributions on the governance function and implementation of the UNSDFs).

²⁵ See the groundbreaking report by Alexander, K. (2014), *Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III?*, BEI / Cambridge University (assessing the link between systemic environmental risks and financial stability, and offering insights into how some members of the Basel Committee are already acting on these links).

²⁶ See Zetsche, D.A., Buckley, R.P., Arner, D.W., & Föhr, L. (2019), *The ICO Goldrush – A Challenge for Regulators*, 60:2 Harvard International Law Journal, *in press*; Arner, D.W., Zetsche, D.A., & Buckley, R.P., *FinTech, RegTech and Systemic Risk: The Rise of Global Technology Risk*, in Schwarcz, Avgouleas, Busch & Arner (eds), *Systemic Risk in the Financial Sector: Ten Years after the Global Financial Crisis*, CIGI Press, 2019, *in press*; Buckley, R.P., Arner, D.W., Zetsche, D.A., & Weber, R. (2019), *The Road to RegTech: The (Astonishing) Example of the European Union*, 2019 Journal of Banking Regulation 1-11; Arner, D.W., Zetsche, D.A., Buckley, R.P., & Barberis, J. (2019), *The Identity Challenge in Finance: From Analogue Identity to Digitized Identification to Digital KYC Utilities*, 20:1 European Business Organization Law Review 55-80; Zetsche, D.A., Buckley, R.P., Arner, D.W., & Barberis, J. (2018), *From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance*, 14:2 New York University Journal of Law and Business 393-446; Zetsche, D.A., Buckley, R.P., & Arner, D.W. (2018), *The Distributed Liability of Distributed Ledgers: The Liability Risks of Blockchain*, 2018 Illinois Law Review 1361-1407.

devoted to the legal environment governing (and the impact of) certain financial technologies (such as initial coin offerings,²⁷ artificial intelligence,²⁸ crowdfunding,²⁹ blockchain³⁰ and new payment methods³¹). However, besides furthering competition and innovation, and balancing the former with traditional objectives of financial regulation,³² little attention has so far been focused on how to ensure financial inclusion as a wider objective of the promotion of FinTech. This is a gap this article seeks to fill.

While, as demonstrated above, our cross-disciplinary analysis is a radical step away from traditional disciplinary boundaries of legal scholarship,³³ we follow the practical approach undertaken by development bodies. *Their* interdisciplinary tendency is demonstrated by widely recognized reports issued eg. by the G20 and the United Nations.³⁴

²⁷ See eg. Chiu, H. (2018), *Decoupling Tokens from Trading: Reaching Beyond Investment Regulation for Regulatory Policy in Initial Coin Offerings*, 3 *International Business Law Journal* 265-287.

²⁸ Cf. Vermeulen, E., Fenwick, M., & Corrales, M. (2018), *Business and regulatory responses to artificial intelligence: Dynamic regulation, innovation ecosystems and the strategic management of disruptive technology*, in Corrales, M., Fenwick, M., & Forgó, N. (eds.), *Robotics, AI and the future of law*, 81-103, Springer Nature.

²⁹ Cf. Hornuf, L., & Schwienbacher, A. (2017), *Should securities regulation promote equity crowdfunding?*, 49:3 *Small Bus Econ* 579-593.

³⁰ See Paech, P. (2017), *The Governance of Blockchain Financial Networks*, 80:6 *Modern Law Review* 1073-1110; Vermeulen, E., & Fenwick, M. (2019), *Technology and corporate governance: Blockchain, crypto, and artificial intelligence*, 48:1 *Texas Journal of Business Law* 1-15; Avgouleas, A., & Kiayias, A., (2019), *The promise of blockchain technology for global securities and derivatives markets: The new financial ecosystem and the "holy grail" of systemic risk containment*, 20 *European Business Organization Law Review* 1-30; Fink, M. (2018), *Blockchain Regulation and Governance in Europe*, Cambridge University Press.

³¹ Cf. Chiu, I. (2017), *A new era in fintech payment innovations? A perspective from the institutions and regulation of payment systems*, 9:2 *Law, Innovation and Technology* 190-234.

³² See Allen, H.J. (2019), *Regulatory Sandboxes*, 87:3 *George Washington L. Rev.* 579-645; Avgouleas, A. (2018), *The role of financial innovation in EU Market integration and the Capital Markets Union: A re-conceptualisation of policy objectives*, in Avgouleas, E., Busch, D., & Ferrarini, G. (eds), *Capital Markets Union in Europe*, 171-192, Oxford University Press; Brummer, C. (2015), *Disruptive Technology and Securities Regulation*, 84 *Fordham L. Rev.* 977-1052; Brummer, C., & Yadav, Y. (2019), *FinTech and the Innovation Trilemma*, 107 *Geo L.J.* 235-307; Chiu, I. (2016), *Fintech and Disruptive Business Models in Financial Products, Intermediation and Markets - Policy Implications for Financial Regulators*, 21:1 *Journal of Technology Law and Policy* 55-112; Haddad, C., & Hornuf, L. (2019), *The Emergence of the Global Fintech Market: Economic and Technological Determinants*, 53:1 *Small. Bus. Econ.* 81-105; Omarova, S.T. (2019), *New Tech v. New Deal: Fintech As A Systemic Phenomenon*, 36 *Yale Journal on Regulation* 735-793; Magnuson, W.J. (2018), *Regulating Fintech*, 71 *Vanderbilt L. R.* 1168-1226; Ringe, W., & Ruof, C. (2018), *A Regulatory Sandbox for Robo Advice*, EBI Working Paper No 26/2018, <https://ssrn.com/abstract=3188828>.

³³ To our knowledge, two exceptions apply. A recent volume edited by representatives of the European Bank for Reconstruction and Development, to which we have contributed, links to our knowledge for the first time sustainable finance to financial technologies and inclusion. See Walker, J., Pekmezovic, A. & Walker, G. (eds.) (2019), *Sustainable Development Goals – Harnessing Business to Achieve the SDGs through Finance, Technology and Law Reform*, Wiley & Sons. Our contribution in that volume is Zetzsche, D.A., Buckley, R.P., & Arner, D.W., *FinTech for Financial Inclusion: Designing Infrastructure for Financial Transformation*, Ch. 10. Further, an article by Chiu & Greene proposes using ICO-style fund-raising in order to achieve greater marketization of sustainable and social finance products, see Chiu, I., & Greene, E.F. (2019), *The Marriage of Technology, Markets and Sustainable (and) Social Finance: Insights from ICO Markets for a New Regulatory Framework*, 20:1 *EBOR* 139-169.

³⁴ See eg. the G20 Global Partnership on Financial Inclusion (GPMI)'s report *Digital Financial Inclusion: Emerging Policy Approaches* (2018), a follow-up to the 2016 G20 High-Level Principles on Financial Inclusion, as well as the GPMI Financial Inclusion Policy Guide on Digitisation and Informality, endorsed in August 2018. See also the United Nation Capital Development Fund (2019), *Improving Distribution of Digital Financial*

In line with this approach, this article examines why FinTech is important for sustainable development and how regulators and governments can design a comprehensive strategy to support digital financial transformation, underpinning financial inclusion *and* sustainable balanced development at the same time. Neither FinTech nor financial inclusion are objectives in themselves. Rather, both are *tools* to build a sustainable future.

II. Financial Inclusion and Sustainability: The Long-term Perspective

While financial inclusion is not included specifically in the UNSDGs, we suggest that it plays a central role in underpinning the SDGs as well as supporting finance in support of their achievement. This part examines FinTech, its relationship with financial inclusion, and how FinTech for financial inclusion relates to sustainability, the central objective of the UNSDGs.

A. Financial Inclusion: Why It Matters

Financial inclusion involves delivering financial services at affordable cost to all parts of society.³⁵ It enables people to manage their financial obligations efficiently, reduces poverty and supports wider economic growth.³⁶ First, it reduces individuals' vulnerability. For instance, facilitating saving allows people to weather shocks and invest in their education, health and micro-businesses. Second, it increases the efficiency of daily life: bills can be paid electronically without time off work. Third, financial inclusion allows the socialization and diversification of peoples' financial risks through the financial system. For instance, breadwinner insurance can prevent people falling back into poverty. Fourth, financial inclusion supports economic growth through increasing financial resources to support real economic activity, particularly for individuals and small and medium enterprises (SMEs).

B. Two Sides of the Same Coin

Financial inclusion is crucial to address today's global challenges as outlined in the UN SDGs. Financial access (particularly through FinTech, as will be discussed in more detail below) is one way to reduce the burden of life's challenges, including sickness, crime, poverty, unemployment, age, etc.³⁷ Financially excluded individuals lack tools to prepare for and manage such risks. For instance, farmers without access to electronic payment systems worry about theft; and may consume more immediately rather than take the risk. Health insurance can secure one's long-term working capacity. Savings can fund children's educations and provide for old age. These are long-term goals. Financial exclusion takes from people the opportunity to think, plan and *act* long-term. Where risks that could be avoided, hedged, or socialized through the financial system materialize we force the excluded to think and act *short-term*, often unsustainably. Financial inclusion and sustainability are two sides of the same coin, aimed at the UN SDG's core objective: promoting prosperity while balancing risks.

Services in Rural Areas, <https://www.uncdf.org/article/4542/improving-distribution-of-digital-financial-services-in-rural-areas>; World Bank (2019), *Financial Inclusion Beyond Payments – Policy Considerations for Digital Savings*, <http://documents.worldbank.org/curated/en/467421555393243557/pdf/Financial-Inclusion-Beyond-Payments-Policy-Considerations-for-Digital-Savings-Technical-Note.pdf>.

³⁵ FATF, *FATF Guidance: Anti-Money Laundering and Terrorist Financing Measures and Financial Inclusion* (February 2013) 12.

³⁶ Center for Financial Inclusion, *About Financial Inclusion 2020* <http://www.centerforfinancialinclusion.org/fi2020/about-fi-2020>.

³⁷ These are listed as key challenges in the United Nations Sustainable Development Goals, <https://www.un.org/sustainabledevelopment>.

The connection between financial inclusion and the UN SDGs, may lead one to expect to find financial inclusion as a UN SDG. While it is not, analysis suggests that financial inclusion underlies success in all the SDGs and therefore should be seen as a key underlying objective in seeking balanced sustainable development.

Table 1: Financial inclusion and the UN SDGs

No.	Goals	Impact Direct= D Indirect =I	How financial inclusion can further goal
1	No poverty	I	Access to finance supports poverty reduction
2	Zero hunger	I	Enhance financial stability; stabilize cash-flows through saving and lending
3	Good health and well-being	I	Provide health insurance and financial stability
4	Quality education	I	Enable financial planning and saving for school fees
5	Gender equality	D	Strengthening female entrepreneurship and financial control
6-7	Clean water and sanitation; affordable and clean energy	I	Financing development and maintenance of infrastructure
8	Decent work and economic growth	D	Availability of finance supports entrepreneurship, SMEs and innovation
9	Industry, Innovation and Infrastructure	D	Provide financing for development and maintenance of infrastructure
10	Reduced inequalities	D	Enable funding of education and savings which provide the best opportunity for greater participation
11	Sustainable cities and communities	I	Finance is key to achieving all the targets; increases the domestic and international resources available to focus on infrastructure development
12	Responsible consumption and production	I	Key to achievement is financing of research and development as well as infrastructure and education; increases resources – domestic and international – available
13	Climate action	D	Identifying and managing both new forms of existing risk as well as new risks and creating systems which expand financial resources available

14	Life below water	I	Providing alternatives to unsustainable production
15	Life on land	I	Providing alternatives to unsustainable production
16	Peace, justice and strong institutions	I	Economic development strengthens peace and civil institutions
17	Partnerships	D	Allows for engagement of private actors, multiplying assistance of public or state-supported actors

Financial inclusion can thus be seen to support the broader achievement of the UN SDGs.

C. Financial Inclusion: A Developing Country Topic?

It is undebated that financial exclusion, in the formal sense, is less widely spread in developed countries. However, this does not mean that the population in developed countries know how to use their bank access well: As of 2014, the World Bank estimates that only 33% of all adults globally (and only 38% of account-owning adults) are **financially literate** (among them 57% of account owners in major advanced economies, and 30% in major emerging economies).³⁸ In this context, financial literacy means the ability to manage one's finances independently, without a financial advisor.³⁹ Assuming that approximately 1/3 of the world's population are children and subtracting the 1.7 billion formally excluded from the financial illiterate **approximately 1.7 billion adults** globally remain that cannot put their financial services access to good use despite access. The EU numbers are equally discouraging. Based on World Bank figures (2014), 53% of the EU's adult population is financially illiterate.

FinTech, if rightly designed and applied (eg. through robo advisors making recommendations based on clients' interests), could come to the account holders' assistance. However, according to Eurostat, 37% of EU individuals over age 65 have never used the internet.⁴⁰ The UK Financial Conduct Authority (as an example of an advanced economy) estimates that 1 in 5 consumers lack the digital skills to use digital financial services.⁴¹ At a time where 1 in 4 bank

³⁸ See Klapper, L., Lusardi, A., & van Oudheusden, P., *Financial Literacy Around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey*, GFLEC working paper, at 16.

³⁹ See Klapper, L., Lusardi, A., & van Oudheusden, P., *Financial Literacy Around the World: Insights from the Standard & Poor's Ratings Services Global Financial Literacy Survey*, GFLEC working paper, at 16.

⁴⁰ The UK's Financial Conduct Authority (2016), *Access to Financial Services in the UK*, Occasional Paper 17, <https://www.fca.org.uk/publication/occasional-papers/occasional-paper-17.pdf>, at 13.

⁴¹ The UK's Financial Conduct Authority (2016), *Access to Financial Services in the UK*, Occasional Paper 17, <https://www.fca.org.uk/publication/occasional-papers/occasional-paper-17.pdf>, at 13.

branches will be closed by 2020,⁴² and more bank branches are about to close in poor quarters than in rich⁴³ - technological exclusion translates into financial exclusion.⁴⁴

Despite many national and EU initiatives,⁴⁵ the transposition of findings in specific regulatory and legislative steps aimed at financial inclusion is lagging behind; analysis of how legislation, with the assistance of technology, could respond to financial illiteracy is sorely needed.⁴⁶ Multiple regulators seek to draw lessons from (and implement) the UN's digital literacy framework⁴⁷ - with Kenya's Three-Step-System of (1) familiarizing, (2) using, and (3) creating and programming software providing a particularly active example.⁴⁸ But despite all these efforts, due to the enormous dimensions of the problem both digital and financial illiteracy is here to stay - financial law has to accept wide-spread illiteracy as a given regulatory precondition. In light of this, ensuring FinTech for Financial Inclusion is a crucial intermediate goal on the road towards a long-term, sustainable, yet prosperous world.

III. FinTech, Financial Inclusion and Sustainability

Increasing financial inclusion is being seen – correctly in our view – not as an end in itself but as one fundamental support for achieving broader sustainable development objectives, including the UN SDGs.

If financial inclusion is beneficial for sustainability in terms of underpinning the achievement of the UN SDGs, what is the role of FinTech?

⁴² See report by consultancy firm McKinsey cited in Wallace, T. (2015), *Thousands more UK bank branches could face closure*, <http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/11863736/Thousands-more-UK-bank-branches-could-face-closure.html>.

⁴³ [DZ to do: cite article from financial inclusion circular*].

⁴⁴ See Nguyen, H-L.Q. (2014), *Do Bank Branches Still Matter? The Effect of Closings on Local Economic Outcomes*, <http://economics.mit.edu/files/10143> (stating that closings have prolonged negative impact on credit supply to local small businesses of -13% for several years, even after the entry of new banks), as well as Nguyen, H-L.Q. (2019), *Are Credit Markets Still Local? Evidence from Bank Branch Closings*, 11:1 American Economic Journal: Applied Economics 1-32 (stating that bank branch closings in the USA in during the 2000s lead to a persistent decline in local small business lending (fall by 453,000 USD after a closure off a baseline of 4,700,000 USD) for six years, while being very localized, dissipating within six miles.).

⁴⁵ See the overview of the initiatives and discussions on the European Commission's platform for adult learning, <https://epale.ec.europa.eu/en/themes/financial-literacy>.

⁴⁶ See the recent proposal by Safeguarding Ireland, *Scoping of a Regulatory Framework for Adult Safeguarding Welcomed - Call for Establishment of a National Advocacy Service*, taken from the European Commission's platform for adult learning, <https://epale.ec.europa.eu/en/content/scoping-regulatory-framework-adult-safeguarding-welcomed-call-establishment-national>.

⁴⁷ UNESCO (2018), A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2, Information Paper No. 51, UIS/2018/ICT/IP/51, <http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf> (UN digital literacy framework).

⁴⁸ See Kenyan *Digital Literacy Programme* by the Ministry of Information, Communications and Technology (ICT): <http://icta.go.ke/update-on-the-digital-literacy-programme-being-implemented-by-the-ict-authority/>.

A. FinTech and Financial Inclusion

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 ('FIEG'),⁴⁹ Global Partnership for Financial Inclusion ('GPFI') and the endorsement of the first Financial Inclusion Action Plan ('FIAP') by G20 leaders.⁵⁰

The GPFI formally recognized digital financial solutions as critical to facilitate global financial inclusion in 2016⁵¹ and introduced the G20 High Level Principles for Digital Financial Inclusion (HLPs).⁵² Alongside the Recommendations for Responsible Finance⁵³ and the ID4D,⁵⁴ the HLPs aim to encourage and guide governments to embrace digital approaches to financial inclusion. In 2017, the FIAP was updated to reflect the pivotal role of digitization.⁵⁵

The Alliance for Financial Inclusion (AFI) was established in 2008 by developing country central banks to focus exclusively on financial inclusion. In 2012, its members signed the historic Maya Declaration on Financial Inclusion, by which developing countries committed to financial inclusion targets and national policy changes and other agreements have followed.⁵⁶

The UN also established the Task Force on Digital Financing in November 2018 in an effort to develop strategies that promote financial technology to advance the SDGs. Recognizing that FinTech for financial inclusion requires nothing less than an overhaul of the entire financial system, the UN's Task Force is committed to "put people at the centre," i.e. it supports the view expressed herein that FinTech is an important, possibly the most important, single accelerator for attainment of the SDGs.⁵⁷

⁴⁹ G20 Financial Inclusion Experts Group, *Innovative Financial Inclusion* (ATISG Report, 25 May 2010); GPFI, *Principles and Report on Innovative Financial Inclusion* <http://www.gpfi.org/publications/principles-and-report-innovative-financial-inclusion>.

⁵⁰ G20, *Financial Inclusion Action Plan* (2010) 3; R. P. Buckley, 'The G20's Performance in Global Financial Regulation' (2014) 37(1) *University of New South Wales Law Journal* 63.

⁵¹ GPFI, *Launch of the G20 Basic Set of Financial Inclusion Indicators* (Apr. 22, 2013) <http://www.gpfi.org/featured/launch-g20-basic-set-financial-inclusion-indicators>.

⁵² GPFI, above n 51.

⁵³ See Responsible Finance Forum, *Best Practices and Recommendations on Financial Consumer Protection* (Apr. 2011) <https://responsiblefinanceforum.org/publications/best-practices-recommendations-financial-consumer-protection/>.

⁵⁴ See World Bank, *Identification for Development* <http://www.worldbank.org/en/programs/id4d>.

⁵⁵ Timmermann and Gmehling, *Financial Inclusion and the G20 Agenda* (Paper presented at the International Statistical Institute Regional Statistics Conference, Bali, Mar. 22-24, 2017) https://www.bis.org/ifc/events/ifc_isi_2017/06_timmermann_paper.pdf.

⁵⁶ AFI, *Maya Declaration* <https://www.afi-global.org/maya-declaration>; AFI, *Maya Declaration Continues to Evolve with Financial Inclusion Commitments from 66 Countries* (Nov. 6, 2017) <https://www.afi-global.org/news/2017/11/maya-declaration-continues-evolve-financial-inclusion-commitments-66-countries/>.

⁵⁷ United Nations Secretary General, *Task Force on Digital Financing of Sustainable Development Goals* (Statement, 29 Nov 2018) <https://www.un.org/sg/en/content/sg/personnel-appointments/2018-11-29/task-force-digital-financing-sustainable-development/>.

There is thus strong support for the idea that FinTech does play an important role in financial inclusion. What role can FinTech play in sustainability more broadly?

B. FinTech and Sustainability

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

The first is enhancing the allocation of existing financial resources to support sustainable development. This takes place through business models, incentives, policies and regulations to redirect financial resources globally and in individual countries to provide SDG-related finance. Examples include ESG (environmental, social and governance) and Green investment strategies, and the rapid growth in the EU China and Japan in particular in ESG-related financing.

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 globally and particularly in developing countries and by which savings, investment and inclusion increases result in potentially large amounts of new money available. China's digital financial transformation is perhaps the best example of this.

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 of regulatory technology (RegTech) to design better financial and regulatory systems to achieve policy objectives, with the India Stack strategy showing the dramatic potential on offer.

Table 2⁵⁸ presents how FinTech contributes directly or indirectly to the UN SDGs.

Table 2: How FT4FI could further the UNSDGs

Nr	Goals	Impact Direct= D Indirect= I	How FT4FI can further goal
1	No poverty	I	Allow for online financing, including credit and crowdfunding; cr through online markets and payments; reduce impact of dis
2	Zero hunger	I	Enhance financial stability; stabilize cash-flows throug
3	Good health and well-being	I	Provide health insurance and financial sta
4	Quality education	I	Provide financial planning and savings for so

⁵⁸ The Table draws on the authors' own research and experience. That digital financial services support the UNSDGs is very broadly accepted: see United Nations, Digital Finance and the SDGs, <http://www.uncdf.org/mm4p/dfs-and-the-sdgs>.

5	Gender equality	D	Strengthening female entrepreneurship and financial inclusion
6	Clean water and sanitation	I	Provide financing for development and maintenance of infrastructure and sustainability expertise
7	Affordable and clean energy	I	Provide financing for development and maintenance of infrastructure and sustainability expertise
8	Decent work and economic growth	D	Allow for online financing, including credit and crowdfunding; opportunities; ensure funding and use symmetry (long-term for long-term)
9	Industry, Innovation and Infrastructure	D	Provide financing for development and maintenance of infrastructure
10	Reduced inequalities	D	See on gender at UNSDG5. Re regional, economic and educational inclusion provide the best opportunity for greater participation for most societies
11	Sustainable cities and communities	I	FT4FI assists the development of and investment in sustainable technologies
12	Responsible production and consumption	I	FT4FI assists the development of and investment in sustainable technologies
13	Climate action	I	FT4FI assists the development of and investment in sustainable technologies
14	Life below water	I	FT4FI assists the development of and investment in sustainable technologies
15	Life on land	I	FT4FI assists the development of and investment in sustainable technologies
16	Peace, justice and strong institutions	I	Robust economic development strengthens peace and stability
17	Partnerships	D	FT4FI allows for engagement of private actors, multiplying assistance and investment actors

If financial markets are sufficiently mature, providing payment services, long-term financing, insurance services and savings/investment products, supporting financial inclusion – particularly through FinTech – contribute to *all* 17 UN SDGs.

Table 2 makes evident that financial inclusion through FinTech is perhaps *the most important* intermediate step economies must take on their journey to the UN SDGs. Economies should develop strategies for digital financial transformation, focusing on FinTech’s role in financial inclusion, as a response to the most important and difficult question: How should economies approach achieving the UN SDGs?

III. Sustainability through FinTech and Financial Inclusion: Four Pillars of Digital Financial Transformation

For these reasons, an ever-increasing range of international development organizations are focusing on the role of FinTech and digital financial transformation in supporting broader developmental objectives today, including the United Nations Secretary-General's Task Force on Digital Financing of the Sustainable Development Goals⁵⁹, the Alliance for Financial Inclusion⁶⁰, the World Bank and Consultative Group to Assist the Poor (CGAP)⁶¹, and many regional development banks.⁶²

Given the many partly competing, partly complementary initiatives it is crucial to avoid the mistakes of the past. This part addresses two questions: what lessons have we learned; and what types of FinTech are most likely to advance balanced sustainable growth and financial inclusion?⁶³

FinTech today encompasses technologies such as the application of artificial intelligence to big data. Which among these innovations are most likely to facilitate financial inclusion and the UNSDGs?

The immediate answer is mobile money – the provision of e-money on mobile phones – of which the paradigmatic example is M-Pesa in Kenya. The longer-term answer is more complex. The real opportunity FinTech affords is developing an entire infrastructure for a digital financial ecosystem underpinning the SDGs and financial development, inclusion, stability and integrity.

Lessons can be taken from India's FinTech strategy, India Stack, implemented over the last decade. India Stack is a set of APIs which form a digital infrastructure used by the government, businesses and other entities to provide paperless and cashless services.⁶⁴ India Stack involves four main levels.⁶⁵ First is a national biometric identification system. Second is the establishment of bank accounts to deliver national services. Third is a common payment API. Fourth is a series of electronic KYC initiatives allowing individuals to provide their financial details to financial services and other providers. These eKYC utility platforms show how RegTech – regulatory technology – can improve the integrity of financial markets and reduce risks.

⁵⁹ See UN Secretary-General's Task Force on Digital Financing of the Sustainable Development Goals, <https://digitalfinancingtaskforce.org/>.

⁶⁰ See, by these authors, AFI, "FinTech for Financial Inclusion: A Framework for Digital Financial Transformation", Sept, 2018; at <https://www.afi-global.org/publications/2844/FinTech-for-Financial-Inclusion-A-Framework-for-Digital-Financial-Transformation>

⁶¹ Worldbank, Fintech and Financial Inclusion, <http://pubdocs.worldbank.org/en/877721478111918039/breakout-DigiFinance-McConaghy-Fintech.pdf> .

⁶² We know of FinTech initiatives by the Asian Development Bank, the Islamic Development Bank, the European Investment Bank, and the Financial Development Corporation.

⁶³ G20 Global Partnership for Financial Inclusion, *Digital Financial Inclusion: Emerging Policy Approaches* (2017) <https://www.gpfi.org/publications/g20-report-digital-financial-inclusion-emerging-policy-approaches>.

⁶⁴ *What Is IndiaStack?*, <http://indiastack.org/about/>.

⁶⁵ Bose, *India's Fintech Revolution is Primed to Put Banks out of Business*, TechCrunch (June 14, 2016) <https://techcrunch.com/2016/06/14/indias-fintech-revolution-is-primed-to-put-banks-out-of-business/>; To learn more about India Stack, see <http://www.indiastack.org/About-India-Stack>.

Based on India's experience and other successful examples including Kenya, China and Russia, we argued in our major study for AFI that economies must focus on four pillars of digital financial infrastructure to support digital financial transformation.⁶⁶ These four pillars are:

- Pillar I: Digital ID and eKYC for identification and simplified account opening
- Pillar II: Open electronic payment systems, infrastructure and an enabling regulatory and policy environment that facilitates the digital flow of funds from traditional financial intermediaries and new market entrants
- Pillar III: Account opening initiatives and electronic provision of government services, providing vital tools to access services and save
- Pillar IV: Design of digital financial market infrastructure and systems that support value-added financial services and deepen access, usage and stability.

These four pillars are examined below.

Pillar I: Digital ID and eKYC – Establishing the Foundation

Experience indicates that digital identity is central to the transformation process. This is particular challenging in developing countries where substantial numbers of people often lack formal identification documents.

India's Aadhaar system is the first level of India Stack and involves issuing a 12-digit randomized number to all residents for access to government and other services.⁶⁷ Difficulties in implementation should not detract from the potential of a national biometrically-based identification system to underpin a digital financial ecosystem. Digital ID is necessary for subsequent parts of the digital financial ecosystem to rest upon a solid foundation.

The experiences of the UN and Jordan with developing a digital identity solution for refugees illustrates good system design and synergistic development.⁶⁸ IrisGuard is iris recognition technology that converts an iris image into a unique code which is then used to identify the individual.⁶⁹ Since 2016, IrisGuard's EyePay platform has been used by the UN to deliver financial aid. The technology provides sufficient digital identity for beneficiaries to receive food vouchers, withdraw cash and transfer funds without a bank account. EyePay, in conjunction with the Ethereum blockchain, is now used to promote financial inclusion of Syrian refugees in Jordan by processing supermarket and ATM transactions in real-time. More than 2.3 million Syrian refugees in the region are registered in the system so far.⁷⁰

In the European Union, the 2014 eIDAS Regulation was adopted to provide mutually recognized digital identity for cross-border interactions between European citizens, companies and government institutions. Once member states notify the European

⁶⁶ AFI: "FinTech for Financial Inclusion: A Framework for Digital Financial Transformation", Sep. 2018, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3245287

⁶⁷ *About Aadhaar*, Unique Identification Authority of India, <http://bit.ly/2HsyZJd>.

⁶⁸ See <https://www.irisguard.com/node/39>.

⁶⁹ *Ibid.*

⁷⁰ *Ibid.*

Commission of their eID, other member states must recognize it and individuals can use their eID in other member states.⁷¹

Base digital ID needs to extend as broadly as possible to maximize efficiencies. While base identity can be developed from multiple sources, including business-specific e-identities,⁷² base identity provides the fundamental element of the KYC process. Particularly when linked electronically with other golden source data (such as tax information), it provides the basis of a simple eKYC system. The core objective is to make opening accounts for most people and entities simple and cheap, thereby allowing resources to be focused on higher risk customers and protection of market integrity.

Technology enables the reconsideration of existing systems so as to balance market integrity, financial inclusion and economic growth while meeting international financial standards.

For instance, as part of its Aadhaar system, India has developed a paperless eKYC service, to instantly establish the identity of prospective customers.⁷³ The digitization of identity authentication streamlines account opening and allows easy access to both digital and traditional financial services. Axis Bank was the first Indian bank to offer an eKYC facility in 2013, reducing the turnaround time for opening bank accounts from 7-10 days to just one day.⁷⁴ Today, many traditional banks and licensed payments banks in India offer accounts which can be opened and used instantly with eKYC.⁷⁵

The European eIDAS system is intended to be the starting point for a similar system, making it ‘possible to open a bank account on-line while meeting the strong requirements for customer identity’.⁷⁶ This includes accepting electronic identification for meeting CDD requirements.

Such systems – while technically feasible – may not be politically feasible everywhere. Systems of optional digital identity, separate from sovereign identification systems, may hold the greatest transformative potential.⁷⁷

Pillar II: Open, Interoperable Electronic Payment Systems – Building Connectivity

Payments systems provide the fundamental infrastructure for money to flow through any economy. They are foundational to financial inclusion, financial development and the functioning of the real economy. A mobile money ecosystem is one way FinTech can help. Technology enables developing countries to leapfrog bricks-and-mortar bank branches with a seamless digital financial system. Even poorer members of society and SMEs can then have accounts and access the services they need to flourish.

⁷¹ Arner, Zetsche, Buckley & Barberis, *The Identity Challenge in Finance: From Analogue Identity to Digitized Identification to Digital KYC Utilities*, <https://ssrn.com/abstract=3224115>, at 4.3.

⁷² Ibid, at 4.4.2.

⁷³ Desai and Jasuja, *India Stack: The Bedrock of a Digital India*, Medium (Oct. 27, 2016) <https://medium.com/wharton-fintech/the-bedrock-of-a-digital-india-3e96240b3718>.

⁷⁴ *Axis Bank Introduces a Paperless eKYC Based A/c Opening*, India Infoline News Service, https://www.indiainfoline.com/article/news/axis-5875391291_1.html.

⁷⁵ For example, AXIS Bank (https://www.axisbank.com/accounts/savings-account/axis-asap/axis_ASAP.html) and RBL Bank (<https://abacus.rblbank.com/>).

⁷⁶ European Commission, *Consumer Financial Services Action Plan: Better Products, More Choice*, (March 2017) 13-14, https://ec.europa.eu/info/publications/consumer-financial-services-action-plan_en.

⁷⁷ Arner, et al, supra n 33 at 4.4.2.

1. Mobile Money

Mobile money enables mobile phones to be used to pay bills, remit funds, deposit cash, make withdrawals and save, using e-money, sometimes issued by banks but mostly issued by telecommunication companies ('telcos'). The service currently exists in over 89 developing countries and is growing rapidly.⁷⁸ E-money is typically defined as a stored value instrument or product that: (i) is issued on receipt of funds; (ii) consists of electronically recorded value stored on a device such as a mobile phone; (iii) may be accepted as a means of payment by parties other than the issuer; and (iv) is convertible back into cash.⁷⁹

M-Pesa is a major success in providing financial services to a sizable proportion of the Kenyan population.⁸⁰ However, mobile money success has not been consistent across countries. This is due to the differing needs of consumers in different countries, the inability of service providers to adapt to different markets,⁸¹ a tendency of central banks to over-regulate these services,⁸² a lack of trained payments professionals in many markets,⁸³ and cultural and anthropological reasons.

Mobile money services, especially those offered by telcos, are key in defeating financial exclusion in poorer countries, but pose real regulatory challenges. Such services do not initially pose systemic stability concerns and cannot afford, nor require, traditional levels of banking regulation. Furthermore, service providers benefit from a central bank that encourages innovation and understands local customer needs: a major shift from the traditional role of central banks.

2. Designing Regulatory Infrastructure for an Open Electronic Payments System

In China, Alipay and WeChat Pay show the power of facilitating new entrants and the digitization of the traditional payments system among banks.

Alibaba established Alipay in 2004 as a payment method for its ecommerce business. It is now the second largest mobile wallet provider in the world, behind PayPal.⁸⁴ The Yu'e Bao

⁷⁸ GSMA, *State of the Industry 2014 - Mobile Financial Services for the Unbanked* (March 2015) https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2015/03/SOTIR_2014.pdf.

⁷⁹ Mobile Financial Services Working Group, *Mobile Financial Services: Basic Terminology*, Alliance for Financial Inclusion (Aug. 1, 2014) <http://www.afi-global.org/library/publications/mobile-financial-services-basic-terminology-2013>.

⁸⁰ In 2016, through embracing M-Pesa and other digital payment networks, over 75% of adults in Kenya had access to formal financial services, a 26.7% increase from a decade earlier, N. Ndung'u, *M-Pesa - A Success Story of Digital Financial Inclusion*; <https://www.geg.ox.ac.uk/sites/geg/files/M-Pesa%20-%20a%20success%20story%20of%20digital%20financial%20inclusion%20-%20Njuguna%20Ndung%E2%80%99u.pdf>.

⁸¹ Buckley and Webster, 'FinTech in Developing Countries: Charting New Customer Journeys' (2016) 44 *Journal of Financial Transformation* 151.

⁸² For example, the Central Bank of Kenya applied a "light-touch" approach from the outset, which many believe assisted the provision of these services.

⁸³ Buckley and Mas, 'Coming of Age of Digital Payments as a Field of Expertise' (2016) Vol 2016(1) *Journal of Law, Technology & Policy* 71.

⁸⁴ Bushell-Embling, *Alipay Is World's Second Largest Mobile Wallet*, ComputerWorld Hong Kong (Apr. 9, 2018) <https://www.cw.com.hk/digital-transformation/alipay-world-s-second-largest-mobile-wallet>.

money market fund was established with Alipay in 2013, providing the opportunity to make small investments, and is now the world's largest money market fund.⁸⁵

WeChat was established as a messaging platform by Tencent in 2011. In 2013, the WeChat Wallet was introduced, allowing users to make mobile payments in WeChat games. Cash transfers and in-store cashless payments became possible in 2014,⁸⁶ and by 2017, 92 percent of survey respondents were using mobile payment systems like this for retail payments.⁸⁷

The People's Bank of China ('PBoC') has since 2017 subjected these mobile wallet services to increasing regulation. Mobile payment institutions are now required to channel payments through a new centralized clearing house, the China Nets Union Clearing Corporation.⁸⁸ The PBoC has also raised payment platforms' reserve funds ratio to 50 percent from 20 percent, gradually increasing to 100 percent over time, to further protect consumers.⁸⁹ Payment institutions must now also obtain permits to offer barcode payments.⁹⁰

These Chinese experiences highlight how payments providers should be subject to appropriate proportional regulation to address risks and provide a level playing field.

Increasingly, interoperability to bring together traditional and new forms of payments are central to making such systems attractive. As such, governments are increasingly mandating interoperability as a licensing condition for payments providers; in many cases, governments are even involved in the development of switches to provide the supporting infrastructure for such interoperability across different systems.

The combination of digital ID/eKYC with open electronic payments provides the fundamental infrastructure. The greatest digital transformation can be achieved by combining these with Pillar III.

Pillar III: Electronic Government Provision of Services – Expanding Usage

While various governments have experimented with electronic provision of services and mandatory account approaches, their effect is often limited unless built upon Pillar I and II infrastructure. This combination has underpinned the third element of India Stack, namely providing government salaries and services electronically through bank accounts.

Such systems support financial inclusion, empowerment and savings and may also dramatically reduce leakage, facilitating and supporting all aspects of achieving the UNSDGs. Such systems have the potential to improve tax collection, as SMEs grow within

⁸⁵ Mu, *Yu'ebao: A Brief History of the Chinese Internet Financing Upstart*, Forbes (May 18, 2014) <https://www.forbes.com/sites/ericximu/2014/05/18/yuebao-a-brief-history-of-the-chinese-internet-financing-upstart/#25c898583c0e>.

⁸⁶ Millward, *7 Years of WeChat*, Tech In Asia (Jan. 21, 2018) <https://www.techinasia.com/history-of-wechat>.

⁸⁷ China Tech Insights, *WeChat User & Business Ecosystem Report 2017* (2017) <https://technode.com/2017/04/24/wechat-user-business-ecosystem-report-2017/>.

⁸⁸ Hong, *How China's Central Bank Is Clamping Down on the Mobile Payment Industry*, Forbes (Aug. 18, 2017) <https://www.forbes.com/sites/jinshanhong/2017/08/18/how-chinas-central-bank-is-clamping-down-on-the-mobile-payment-industry/#5fa0a13b50be>.

⁸⁹ Wang, *China Tightens Regulations over Mobile Payment Apps – What's Next for Tencent and Ant Financial?*, Forbes (Jan. 3, 2018) <https://www.forbes.com/sites/ywang/2018/01/03/china-tightens-regulation-over-mobile-payment-apps-whats-next-for-tencent-and-ant-financial/#47e526ae7f1d>.

⁹⁰ Xinhua, *China Looks for Right Balance between Financial Innovation, Risk*, China Daily (Dec. 30, 2017) <http://www.chinadaily.com.cn/a/201712/30/WS5a46fd55a31008cf16da4599.html>.

the formal financial system instead of outside. The Pillar I-II-III infrastructure can also support national pension systems, which enhance the financial safety net and provide additional financial resources to support growth.

1. Electronic Payment: Government Salaries and Transfers

For the poor, state support payments are often important. Digital financial transformation policies focused on government payments – particularly to the poor – achieve three beneficial outcomes. First, digital payments enable governments to shift from in-kind assistance (food, water supply) to inexpensive cash transfers.⁹¹ Second, accounts established for support payments can be used for non-government payments. Third, the need to use the technology to receive government payments can break down cultural attachment to cash.

There are many notable examples of Government-to-Person (“G2P”) payment programmes aiming at financially including the unbanked as well as enhancing the efficiency and effectiveness of government services, transfers and payments. At least 19 G2P programmes operate in developing countries.⁹² However, most of these projects are at best half-digital. In the case of *Bolsa Familia* in Brazil, *Familias* in Colombia, and *Benazir* in Pakistan, a debit card is provided to recipients who may withdraw cash. However, further digitalizing these projects faces real challenges. According to CGAP, “31 percent of accounts in low-income countries... [are] used for only one or two withdrawals per month.”⁹³ CGAP has identified potential reasons for this, including use limitations of accounts and insufficient recipient and agent training.⁹⁴

The Center for Financial Inclusion highlights the need for payment processes to ‘align with customer life patterns.’⁹⁵ For instance, in a Pakistani G2P women’s programme, only 53% of transactions were initiated by women; the rest were by male representatives.⁹⁶ Consequently, the Pakistan government adopted biometric technology, ensuring women received cash transfers directly, thereby hopefully empowering them to decide how to use the money.⁹⁷

G2P payments can further financial inclusion and the UNSDGs, *if properly designed*. However, G2P payments frequently have not successfully underpinned a flourishing digital financial ecosystem. In particular, the three following features must be addressed:

1. Government-designed account procedures should facilitate later unrestricted payments.
2. The digital-to-real gap must be bridged well. When digital transaction partners are few, individuals will prefer cash. If merchants cannot do business without accepting e-money, they will provide devices to accept e-money efficiently, with or without incentives. Hence, it all starts with e-liquidity on the customers’ side.

⁹¹ CGAP, *Govt. to Person Payments*, <http://www.cgap.org/topics/gov-person-payments>; G. Stewart, *Government to Person Transfers - On-Ramp to Financial Inclusion?* (2016) https://www.centerforfinancialinclusion.org/storage/documents/Government_to_Person_Transfers.pdf.

⁹² Stewart, id, 29 (citing policy reports from PFIP, CGAP, Gates Foundation and others).

⁹³ CGAP, above n 913.

⁹⁴ Ibid.

⁹⁵ Stewart, above n 923, 2.

⁹⁶ Id at 19.

⁹⁷ Government of Pakistan/BISP, *Women Empowerment: Status and Challenges* (2017) 12, <http://bisp.gov.pk/wp-content/uploads/2017/05/BISP-Women-empower-forum-24-05-2017-latest.pdf>.

3. Functionality must be simple. The learning required to receive government support must enable one to make and receive other transfers. A customized set-up could assist, for instance by providing customers with the account information of their most important recipients.

2. Electronic Payment and Provision: Other Core Services

The combination of Pillars I, II and III supports many service payments, particularly for utilities and telecommunications, that improve the lives of individuals. The infrastructure for Pillars I, II and III also supports ecommerce, with significant benefits for SMEs.

Governments can support digital transformation by highlighting the advantages of e-money, setting limits for cash transactions in the real economy, and requiring merchants to accept digital payments at low or no cost to customers.

More transformational, integrated strategies integrating Pillars I, II and III have the potential to transform government revenue, delivery of services, and trust and confidence. This combination is very powerful from the standpoint of supporting the achievement of the UNSDGs.

From the mutually reinforcing foundations of Pillars I-III, Pillar IV focuses on other forms of infrastructure to support access to finance more broadly.

Pillar IV: Design of Financial Market Infrastructure and Systems – Enabling New Activities, Business and Wider Development

Additional forms of digital financial infrastructure, combined with the foundations of Pillars I-III can support access to finance, financial stability and market integrity. Digitized systems for securities trading, clearing and settlement can also provide greater access to investment products and support financial sector development more broadly, as evidenced through the experiences of China, Kenya and India, among others.

1. Transforming Credit Provision: From Collateral and Microfinance to Cash-flow

Historically, credit risk analysis was conducted only by specialized banks, making it uncommercial for many individuals and SMEs. The traditional solution was to rely on collateral, which is difficult in developing countries where property rights may be weak or nonexistent.

Digitalization has changed this. Providers with accurate customer data are well placed to price credit through datafication, i.e. the process of analyzing and using data. Superior data may derive from social media services, search engines, e-commerce platforms, and telcos.⁹⁸

The big data approach applied by these firms (referred to as ‘TechFins’) should improve business decisions by helping form a better picture of a customer’s financial position using these superior data sets.

TechFins can thus **‘re-personalize’ the financial relationship** with clients by adjusting credit rates based on individuals’ real risk profiles. This enables financial inclusion by providing ‘personalized’ services at a much lower cost per client.

The potential benefits are huge but the emergence of such platforms also brings new challenges and risks, some existential from the standpoint of the UNSDGs, meaning

⁹⁸ Zetsche, Buckley, Arner and Barberis, ‘From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance’ (2018) 14 *New York University Journal of Law and Business* 101 (2018).

approaches to the interaction between data regulation and financial regulation must be considered carefully.

2. Adding Insurance and Investments to Savings and Credit

While online payments and lending are the core of most financial inclusion strategies, extensions into the investment sector are necessary. Digitalization can increase access and reduce transaction costs. It also may reduce biases in investments and strengthen capital markets through enhanced savings rates. Importantly, it also has the potential to bring new financial resources into the financial system which can in turn support innovation, business development, human capital and infrastructure, as savings rates increase and are redirected through the financial system, thereby underpinning attainment of the UNSDGs.

However, digitalization also brings risks. The main challenge is the uncertainty and complexity which are inherent in investments. Bridging the trust divide – as investors must trust intermediaries to control risk – is at the heart of developing liquid financial markets.

3. Building Better Financial Infrastructure

Today, cloud, IoT, blockchain and other technologies are being used to redesign markets and infrastructure, particularly in payment systems, securities clearing and settlement systems, early stage financing, and trade and agricultural finance. Maximizing this potential requires the foundation of Pillars I-III.

IV. Developing a Comprehensive Strategy

A. Strategic Approach

The starting point is that the power of these pillars is greatest when all are pursued and become mutually reinforcing. This is the core lesson from India Stack and can be seen in an increasing range of countries which are pursuing integrated strategies to support financial inclusion and digital financial transformation.

B. The Challenge of Technology

Any FinTech-based approach must accept that technology is not perfect. Three consequences follow.

First, technology may operate beyond its developers' intentions. Self-learning algorithms may enhance biases existing in the data.⁹⁹ Perfect technologies to control this tendency do not yet exist. Hence, providers must constantly test the outcomes of algorithmic data interpretation.

Second, technology may do exactly what the developers intend, and the problem is the developers. Financial history is replete with fraud. Every new technology will be abused by some. A recent example is the use of initial coin offerings for defrauding investors/participants.¹⁰⁰

⁹⁹ See e.g. Uber's use of machine learning: H. Reese, *How Data and Machine Learning Are 'Part of Uber's DNA'*, TechRepublic (Oct. 21, 2016) <https://www.techrepublic.com/article/how-data-and-machine-learning-are-part-of-ubers-dna/>.

¹⁰⁰ Zetzsche, Buckley and Arner, 'The ICO Gold Rush', (2019) 60 (2) *Harvard International Law Journal* 301-349

Third, ever-accelerating technology facilitates ever more new entrants, making regulators' roles ever more challenging. This will likely require regulators to respond with technology. RegTech includes automation and data-driven analysis of internal control systems and internal and external reporting.

C. Building Innovation Ecosystems: Regulatory Sandboxes, Piloting and Test-and-Learn Approaches, and RegTech

Probably most important is the need for policymakers and regulators to develop methods to understand new technologies and the related risks and opportunities combined with the increasing necessity for regulators to consider how they can better use technology in redesigning their systems for the regulation of digital finance and FinTech.

One recent development to potentially assist digital financial transformation is regulatory sandboxes.¹⁰¹ The sandbox creates an environment for businesses to test products without having to meet the full panoply of regulation. In return, regulators require appropriate safeguards. The main advantages of sandboxes extend beyond the regulator's exemption. A sandbox sends a market message that the regulator is open to innovation and provides learning opportunities for regulators. The main risks of sandboxes are the potential to jeopardise regulatory priorities and supervisory 'over-friendliness' due to capture or corruption.

We note, however, that 'no two regulatory sandboxes are alike': Most regulators practice, under the sandbox label, something we find more akin to an innovation hub, i.e. a structured way of communication with innovative firms that results in guidance to the firm and mutual learning, but no regulatory privilege is automatically granted to the innovative firms; further, while innovation hubs require resources and the involvement of seasoned supervisors, they often function without substantial changes to legislation.¹⁰²

Other ways to respond to innovation include more structured approaches to waivers, no-action letters, piloting and testing, and small business exemptions.

Another way resulting in increased regulatory technology expertise is to actually *use* technology: Regulators could require supervised firms to report digitally to supervisors, and supervisors to receive and process reported information by digital means, resulting in a RegTech cycle that will propel both supervised firms and supervisors into the digital age. Successful examples in this regard can be drawn from the European Union.¹⁰³ This use of technology by regulators is the truly transformative potential of RegTech and integrated systems design of the sort we advocate.

D. Balancing Inclusion with Client Protection

Client protection is key for not only digital financial inclusion but digital financial transformation more broadly. One promising option is regulation-by-design: regulatory restrictions embedded technologically in the product. These restrictions would reflect client

¹⁰¹ Zetsche, Buckley, Arner & Barberis, "Regulating a Revolution: From Regulatory Sandboxes to Smart Regulation", (2017) (1) *Fordham Jnl of Corp & Fin'al Law* 31-103.

¹⁰² For a detailed analysis for regulatory sandboxes around the globe, see Buckley, R.P., Arner, D.W., Veidt, R., & Zetsche, D., "Building FinTech Ecosystems: Regulatory Sandboxes, Innovation Hubs and Beyond", forthcoming 61 *Wash. J. L. & Pol'y* (2020).

¹⁰³ See Buckley, R.P., Arner, D.W., Zetsche, D.A., & Weber, R. (2019), *The Road to RegTech: The (Astonishing) Example of the European Union*, 2019 *Journal of Banking Regulation* 1-11.

exposure and ability to bear risks and would substitute for today's restrictions on access to financial services.

A reasonable approach will never aim at full access for all of society to all financial services. To protect clients, any policy must be partially exclusive: restricting access to products too risky for people with low financial literacy. The result will be an asymmetric paternalistic system in which people with greater financial sophistication have access to wider ranges of financial products. We envisage that clients will be assessed by income, education, experience and wealth and categorized in classes. Depending on the class, access to risky products will be controlled. This approach also allows preferred ethical restrictions. For instance, clients who wish to avoid leverage for religious reasons (e.g. Islamic finance) will be able to do so.

The FinTech aspect of this new legal, rather than de facto, segregation, is that criteria can be set, reviewed and adjusted day-to-day, as its application follows data-driven rules, and its outcome can be supervised using RegTech.

Going forward, such principles-based, rather than rules-based, approaches are key to successful regulatory development.

V. Towards Inclusive and Balanced Sustainable Growth

Digital financial transformation is *one* important answer to how regulators and government can support achievement of the UN SDGs, and thus result in a balanced, sustainable development. Digital financial transformation supports achievement of the UNSDGs in three key ways: first, by potentially generating additional financial resources; second, by more efficiently using existing (as well as new) financial resources; and third in some cases by directly supporting achievement.

What sorts of approaches work?

A comprehensive digital financial transformation strategy based on four pillars, including digital ID, open interoperable payment systems, FinTech for G2P programmes, and long-term development of sophisticated financial market infrastructure, is key.

From the standpoint of transforming all aspects of society and development, the most powerful technology which has emerged is the mobile phone, particularly the smartphone when combined with internet access. Research shows the transformative potential in terms of all of the SDGs as well as for financial sector development, inclusion and deepening. The development of inexpensive smartphones combined with new business models which rely less on network charges or handset sales and more on generating data which in turn support commercial applications means that smartphones are ever more available in many countries. Policies supporting smartphone and internet development are among the most important that can be pursued and form the basis of many aspects of digital finance to support the SDGs. Major barriers remain though, particularly in the context of the last mile but also in the context of much of Africa where feature phones still prevail and internet access is mixed. Because of their foundational effect, this is a core area for focus in seeking rapid transformation going forward.

Another transformational technology not only in digital finance but in empowerment more generally is digital identification. Formal identification is an element of the SDGs and because of its significance, is the subject of a major World Bank led initiative: ID4D. The experience of India's Aadhar system, through which over a billion people have received digital biometric identification has been transformative: it has shown the power of such

systems for achieving the SDGs directly as well as increasing financial resources available but, at the same time, has highlighted the potential dangers in data protection and other abuses. Once again, digital identification projects if designed and implemented effectively have the potential to support foundational transformations in directly achieving the SDGs as well as in supporting financial development supporting wider societal transformation.

These foundational technologies offer the potential for other interventions, of which mobile payments have been among the most important from the standpoint of achieving the SDGs, with the example of mPesa in Kenya being the best known. Central to their impact is interoperability, with an increasing range of governments mandating this in order to maximize developmental benefits.

Combining these allows governments, businesses and others to provide better services to people, with important successes in the context of displaced persons through the UNHCR's use of digital delivery of aid. Going forward, these sorts of systems are likely to be increasingly important as migration and others forms of displacement increase. Other examples of mitigation and development include forms of digital crop insurance, pooled digital insurance for catastrophes.

As digital financial transformation proceeds, digital finance increasingly enables individuals to invest small amounts of money, with customer acquisition costs made viable through foundational technologies of the sorts described here. This bring new money to achieve the SDGs, potentially as billions of people join the financial system and are empowered to make investments which support wider social objectives.

Looking forward, the power of digital finance is greatest in those countries which are furthest behind but through policy choices to support foundational technologies are able to leapfrog to higher levels of development. This strategy of digital financial infrastructure development rests fundamentally on availability of communications' infrastructure. It offers the greatest potential in countries with high smart phone penetration rates and inefficient old-fashioned financial systems. While financial inclusion remains a challenge in many countries, the cost of smart phones is falling rapidly, while construction of related infrastructure is proceeding apace in most markets. While this strategy will not solve all challenges – for instance, we may face a new digital divide between the technologically able and others – it does provide the core elements of an enabling framework to support the achievement of the UNSDGs.