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COVID-19, DIGITAL FINANCE AND EXISTENTIAL SUSTAINABILITY CRISES: OPPORTUNITIES AND CHALLENGES FOR LAW AND REGULATION IN THE 2020s

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and Dirk A Zetsche^{****}

Abstract — This article examines how the digital financial infrastructure that emerged in the wake of the 2008 Global Financial Crisis is being tested and leveraged to meet some of the financial, economic and health challenges presented by the COVID-19 pandemic. The origins of the 2008 crisis and the current crisis are different: the 2008 crisis was a financial crisis that spilt over into the real economy, while COVID-19 is a health and geopolitical crisis spilling over into the real economy. As such, COVID-19 – a pandemic and an existential sustainability crisis – requires different approaches. This article explores the role of digital finance in this context on two levels. At the macro level, it identifies how digital finance has been used to address areas of systemic risk and underpin wider financial stability. At the micro level, it illustrates how digital financial tools can be used to address a range of emerging challenges particularly relating to recovery. Looking ahead, it argues that digitisation generally and of

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finance in particular driven by the COVID-19 crisis – while providing effective tools to support the response – has also raised new challenges, especially around new forms of Tech-Risk arising from concentration and data. Looking forward, these are among the most significant challenges for policy, law and regulation in the 2020s.

I. INTRODUCTION

The origins of the Global Financial Crisis of 2008 and the COVID-19 crisis of 2020 are very different and thus, demand different responses and approaches: 2008 was a financial crisis that spilt over into the real economy.¹ COVID-19 as a pandemic is a health and geopolitical crisis – in fact an existential sustainability crisis – spilling over into the real economy, and with the risk of possible financial spillovers, in turn worsening the human and economic impacts in a vicious spiral.

The COVID-19 pandemic has shaken nations around the world. It has tested their healthcare infrastructure, battered their economies, and left whole populations in fear and periodic lockdowns. This is a human health and sustainability crisis first and foremost. The human crisis includes the economic and social consequences of the pandemic, and these secondary implications will be felt for years to come. The United Nations estimates that the global economy contracted by 4.3% in 2020 due to the effects of the pandemic.² In sharp contrast, in 2009, following the 2008 Crisis, the global economy contracted by only 1.7%.³

The pandemic's impact has been devastating in Asia Pacific,⁴ Europe,⁵ Africa and the

¹ Ross P Buckley and Douglas W Arner, 'From Crisis to Crisis: The Global Financial System and Regulatory Failure' (2011) Kluwer Law International Research Paper No 2012/002 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1980010> accessed 6 February 2021.

² United Nations, *World Economic Situation and Prospects* (2021) viii.

³ *ibid.*

⁴ United Nations Economic and Social Commission for Asia and the Pacific, *Assessing the Impact of COVID-19 in Asia and the Pacific and Designing Policy Responses: An Excel-Based Model* (Manual, 14 November 2020); Motoko Rich, Hisako Ueno and Makiko Inoue, 'Japan Declares Emergency as Experts Fear Tip of the Iceberg' *The New York Times* (8 April 2020).

⁵ 'JRC Analyses COVID-19 Impact on Economy and Labour Markets to Help Guide EU Response' (*European Commission*, 3 August 2020) <<https://ec.europa.eu/jrc/en/news/jrc-analyses-covid-19-impact-economy-and-labour-markets-help-guide-eu-response>> accessed 6 February 2021; 'Italy, Spain See Steady Drop in COVID-19 Infections as France Records Deadliest Day' *SBS News* (8 April 2020) <<https://www.sbs.com.au/news/italy-spain-see-steady-drop-in-covid-19-infections-as-france-records-deadliest-day>> accessed 6 February 2021.

Americas.⁶ Its immediate impact on most developed countries has been massive, and its longer-term impact on the developing world, and in particular least developed countries⁷ and indigenous communities,⁸ may yet prove to be even greater, given weaker healthcare systems and infrastructure,⁹ and the dependency on global trade of many of these countries as either natural resource producers or ‘global workbenches’. Disparate impact in terms of race, poverty, and inequality is being seen strongly in developed economies as well. Beyond the widening internal wealth inequalities, the global wealth gap is also widening between the wealthiest developed countries and the rest of the world.

We examine here how the financial infrastructure – in particular digital financial infrastructure – that emerged in the wake of the 2008 Global Financial Crisis has been tested and is being leveraged to both overcome the immediate challenges of the pandemic and manage the longer-term economic impact. We explore some of the lessons arising from the use of digital financial platforms in the COVID-19 crisis, including strategies and tools. Our examples underscore the versatility and agility of financial technology (‘fintech’) and demonstrate how digital financial infrastructure can be robust, resilient, and most importantly, responsive in the face of fluid and unpredictable events, thereby underpinning more resilient systems to address future crises, including the sorts of existential sustainability crises which are likely to become increasingly common across the coming decades.

In this rapidly evolving and unprecedented context, digital financial innovations are being relied upon at both the micro and macro levels to address

⁶ Lucia Mutikani, ‘What to Know About the Report on America’s COVID-hit GDP’ (*World Economic Forum*, 31 July 2020) <<https://www.weforum.org/agenda/2020/07/covid-19-coronavirus-usa-united-states-economy-gdp-decline/>> accessed 6 February 2021; Marc Fisher, ‘The U.S. Death Toll has Reached 100,000’ (*The Washington Post*, 27 May 2020) <<https://www.washingtonpost.com/graphics/2020/national/100000-deaths-american-coronavirus/>> accessed 6 February 2021.

⁷ Dirk Zetzsche and Roberta Consiglio, ‘One Million or One Hundred Million Casualties? – The Impact of the COVID-19 Crisis on the Least Developed and Developing Countries’ (2020) University of Luxembourg: Law Working Paper Series 2020/008 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3597657> accessed 6 February 2021.

⁸ ‘CDC data show disproportionate COVID-19 impact in American Indian/Alaska Native populations’ (*Centers for Disease Control and Prevention*, 19 August 2020) <<https://www.cdc.gov/media/releases/2020/p0819-covid-19-impact-american-indian-alaska-native.html>> accessed 6 February 2021; Aryati Yashadhana and others, ‘Indigenous Australians at Increased Risk of COVID-19 Due to Existing Health and Socio-Economic Equities’ (2020) 1 *The Lancet Regional Health: Western Pacific* <[https://www.thelancet.com/journals/lanwpc/article/PIIS2666-6065\(20\)30007-9/fulltext](https://www.thelancet.com/journals/lanwpc/article/PIIS2666-6065(20)30007-9/fulltext)> accessed 6 February 2021.

⁹ ‘COVID-19: Urgent Action Needed to Counter Major Threat to Life in Conflict Zones’ (*International Committee of the Red Cross*, 30 March 2020) <[icrc.org/en/document/covid-19-urgent-action-needed-counter-major-threat-life-conflict-zones](https://www.icrc.org/en/document/covid-19-urgent-action-needed-counter-major-threat-life-conflict-zones)> accessed 6 February 2021; ‘COVID-19: Effects in Developing Countries, Deans Discussion Harvard University’ (*Harvard Kennedy School*, 22 July 2020) <<https://www.hks.harvard.edu/more/about/leadership-administration/deans-office/deans-discussions/covid-19-effects-developing>> accessed 6 February 2021.

everything from the basic logistical means of transacting,¹⁰ to the strategically important financial fundamentals¹¹ – and everything in between. These fundamentals include liquidity, systemic stability and the ability of the economy to weather unforeseen economic or geo-political shocks. The primary measure taken to combat the spread of COVID-19, ‘social distancing’, has dramatically further embedded digitisation, e-commerce and fintech into modern life. Beyond behavioural adaptation, widespread exposure to the cost savings, convenience, and hygiene associated with digital finance are consolidating fintech usage more broadly, with potentially important and enduring benefits for financial inclusion and sustainable development.¹² This can be seen particularly in the context of electronic payments.¹³

Thus far, the digital financial infrastructure has performed resiliently and responsively. The reliability and consistency of this digital lifeline, should it continue to work well, is transforming fintech – especially electronic payments – from an entrepreneurial novelty to an indispensable element of modern life. At the same time, from late 2020 and into 2021, digitisation of finance combined with massive amounts of central bank liquidity appears to be contributing to new asset price bubbles in the technology and e-commerce sectors around the world, increasing the potential for new financial stability risks: second order effects arising from the initial financial responses to the crisis in 2020.

II. THE FOUR LEVEL INTERRELATIONSHIP BETWEEN FINANCE AND THE REAL ECONOMY

From a financial sector standpoint, the starting point in any crisis – be it a financial, economic or sustainability crisis – is to understand the situation and context, and, from there, to deploy appropriate strategies to prevent or mitigate the financial crisis while minimising damage to the real economy and laying the foundations for a return to financial stability and sustainable development. In the wake of any crisis, legal and regulatory reforms will be necessary to

¹⁰ Margaret Miller et al, ‘How Can Digital Financial Services Help a World Coping with COVID-19?’ (*World Bank Blogs*, 3 August 2020) <<https://blogs.worldbank.org/psd/how-can-digital-financial-services-help-world-coping-covid-19>> accessed 6 February 2021.

¹¹ Jan Bellens et al, ‘How Banks Can Successfully Emerge From COVID-19’ (*EY*, 7 August 2020) <https://www.ey.com/en_qa/banking-capital-markets/how-banks-can-successfully-emerge-from-covid-19> accessed 6 February 2021.

¹² Dirk A Zetzsche, Ross P Buckley and Douglas W Arner, ‘FinTech for Financial Inclusion: Driving Sustainable Growth’ in Julia Walker, Alma Pekmezovic and Gordon Walker (eds), *Sustainable Development: Harnessing Business to Achieve the SDG’s through Finance, Technology and Law Reform* (Wiley 2019) 179; Douglas W Arner et al, ‘Sustainability, FinTech and Financial Inclusion’ (2020) 21 *European Business Organisation Law Review* 7.

¹³ Codruta Boar and Róbert Szemere, ‘Payments go (even more) digital’ (*Bank for International Settlements*, 2020) <https://www.bis.org/statistics/payment_stats/commentary2011.htm> accessed 6 February 2021.

address issues and lessons which arose, to enhance systems prior to the next test, whatever that might be.

The 2008 Crisis originated with a financial crisis.¹⁴ This in turn impacted the real economy as financial resources became unavailable to support economic activity. Conceptually, the ‘real economy’ is distinct from the financial economy in that it refers to the physical production of goods and delivery of services. The ‘financial economy’, in contrast, refers to financial transactions entered into to create wealth. This damage to the real economy, therefore, in turn worsened financial sector issues (through both liquidity and solvency channels) causing a dangerous spiral (including spillovers to various governments around the world).¹⁵

In 2020, the triggering events were different. The situation initially was primarily the result of two shocks. Firstly, a health and existential sustainability crisis: the COVID-19 pandemic starting at the end of 2019.¹⁶ Secondly, a geopolitical crisis:¹⁷ the pandemic has become a domestically politicised issue in many parts of the world feeding into international trade relations as the reverberations of the pandemic widen existing fissures in global trade, economic interactions and geopolitics, including in the context of health, financial, economic and vaccination cooperation and competition.¹⁸ In addition to existing trade tensions between the United States (‘the US’), China, the European Union (‘the EU’), the United Kingdom (‘the UK’), and Canada, among others, the trade relationship between Australia and China, for example, has deteriorated greatly following the Australian government calling for a global inquiry into the origins of the pandemic.¹⁹ Similarly, relations between China

¹⁴ The financial crisis began particularly in wholesale interbank markets resulting from loss of transparency, trust and confidence among major institutional players as a result of widely spread credit losses from securitisation leading to a liquidity and financial solvency crisis: Buckley and Arner (n 1); Laura Chiaramonte, *Bank Liquidity and the Global Financial Crisis* (Palgrave Macmillan 2008) 1.

¹⁵ Ross P Buckley, Emiliios Avgouleas and Douglas W Arner, ‘Three Major Financial Crises: What Have We Learned?’ in Douglas W Arner et al (eds), *Systemic Risk in the Financial Sector: Ten Years after the Great Crash* (CIGI Press 2019) 47.

¹⁶ ‘Rolling Updates on Coronavirus Disease (COVID-19)’ (*World Health Organisation*, 9 April 2020) <<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>> accessed 6 February 2021.

¹⁷ Florence Gaub and Lotje Boswinkel, ‘The Geopolitical Implications of the COVID-19 Pandemic’ (European Parliament, Report PE 603.511, 10 September 2020) <[https://www.europarl.europa.eu/RegData/etudes/STUD/2020/603511/EXPO_STU\(2020\)603511_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/603511/EXPO_STU(2020)603511_EN.pdf)> accessed 6 February 2021.

¹⁸ Kamran Abbasi, ‘Covid-19: Politicisation, “Corruption,” and Suppression of Science’ (2020) 371 *British Medical Journal* <<https://www.bmj.com/content/371/bmj.m4425.full>> accessed 6 February 2021.

¹⁹ Eleanor Albert, ‘China-Australia Relations Continue Their Downward Spiral’ (*The Diplomat*, 4 November 2020) <<https://thediplomat.com/2020/11/china-australia-relations-continue-their-downward-spiral/>> accessed 6 February 2021.

and India have deteriorated, resulting in an increasingly competitive and tense environment.

While the most significant impact of the COVID-19 pandemic is human, the immediate consequences of individual quarantine measures and lockdowns are felt through supply chains (i.e., reduced operation of factories and logistic networks), as well as through demand channels (i.e., reduced individual and business appetite for consumption, and prohibitions on certain services such as travel and hospitality services) globally and locally.²⁰ Furthermore, uncertainties in terms of human casualties and economic damage are severely reducing trust within and between economic and political actors.²¹

As the economic and human toll increases, so does the strain on the financial sector, which remains vital to direct financial resources to address the crisis and support recovery. In order to allay their uncertainties, it seems most economic agents initially sought to maximise their access to cash²² – albeit so far mostly in digital form as opposed to physical cash or gold – with a rush for liquidity around March 2020. Largely as a result of post-2008 financial regulatory reforms and technological developments,²³ the financial sector was able to withstand these initial challenges and then provide a conduit for liquidity and financial support throughout economies across the world. Nonetheless, concerns have emerged in some quarters about the necessity of central bank support in the context of preventing a systemic financial failure. From our standpoint, however, while official liquidity support was necessary, we view this as an essential public good in the context of a market-based financial system, which – on balance – withstood the onslaught of a global panicked rush for liquidity remarkably well and far better than in 2008.

Thus, while the impact has not fallen mainly on the financial sector, maintaining the robustness and effectiveness of the financial sector is central to the overall battle against COVID-19. Unlike 2008, the COVID-19 crisis did not originate in the financial sector, but for the financial sector to operate efficiently, it requires trust between actors and certainty in economic outlook. Looking forward, both of these elements face challenges given the economic and human impact of the crisis.

²⁰ ‘Impact on Workers of COVID-19 Is ‘Catastrophic’: ILO’(UN News, 23 September 2020) <<https://news.un.org/en/story/2020/09/1073242>> accessed 6 February 2021.

²¹ Bongoh Kye and Sun-Jae Hwang, ‘Social Trust in the Midst of Pandemic Crisis: Implications from COVID-19 of South Korea’ (2020) 68 *Research in Social Stratification and Mobility* 100523 <<https://www.sciencedirect.com/science/article/pii/S0276562420300597>> accessed 6 February 2021.

²² Jared Lynch, ‘Cash is King as Dividends Ditched, Costs Slashed’ (*The Australian*, 18 March 2020) <<https://www.theaustralian.com.au/business/cash-is-king-as-dividends-ditched-costs-slashed/news-story/e1268df30778886c05b617f09610f1e7>> accessed 6 February 2021.

²³ See, Douglas W Arner, Janos Barberis and Ross P Buckley, ‘The Evolution of Fintech: A New Post-Crisis Paradigm?’ (2016) 47(4) *Georgetown Journal of International Law* 1271.

In the context of non-synchronous transactions where payments and performance do not coincide, trust and certainty are the transmission mechanisms between the real economy and the financial markets. Companies, governments and individuals may thus face potential second order challenges stemming from this lack of confidence in the form of funding and access to finance (i.e., liquidity) and these will in turn impact the financial sector. A weakened financial sector will be limited in its capability of financing the real economy, in turn worsening business and human outcomes, and potentially starting a vicious downward spiral.²⁴

Targeted interventions to avert such outcomes highlight the central role that digital financial channels can play in alleviating prevailing ills. From this perspective, we identify four levels of intervention, focusing on the role of digital finance, from Macro (infrastructure strain) to Micro (financial health).

The first level, from the standpoint of the financial sector, focuses on the infrastructure of the financial system, particularly payment systems and securities markets (for both companies and governments). One of the greatest concerns is failure in this core infrastructure, which is almost entirely digital. This digital plumbing lies at the core of any financial system, domestic or international.

To the extent this digital financial infrastructure functions as intended, it underpins the financial sector in performing its key functions of liquidity management and financial resource allocation, which are necessary to support economic activity and sustainable development.²⁵ The pandemic and its consequences are revealing whether authorities are prepared in both a regulatory and technical context to manage the fallout of this crisis. Since 2008, governments have placed considerable attention on these key areas to deal with the ordinary economic ebbs and flows. How those regulations, supervisory postures and contingency plans have held up and continue to hold up will be one of the most important lessons of the COVID-19 crisis.²⁶

Monitoring and ensuring crisis resilience of these core infrastructures is essential, as the consequences of failure in times of crisis can be devastating. For instance, both medical and security personnel as well as core IT and financial sector staff and infrastructure are all crucial for the functioning of society as well as the economy and need to be given priority in any emergency. At the same time, it may be necessary in some circumstances to respond to market volatility by calling trading halts or reviewing trading halt trigger mechanisms,

²⁴ See, Douglas Arner, *Financial Stability, Economic Growth and the Role of Law* (CUP 2007); Buckley and Arner (n 1).

²⁵ Zetzsche, Buckley and Arner (n 12).

²⁶ International Monetary Fund, 'A Year Like No Other' (2020) 20 <<https://www.imf.org/external/pubs/ft/ar/2020/eng/downloads/imf-annual-report-2020.pdf>> accessed 6 February 2021.

in the same way that lockdowns and triage have also proven necessary to avoid system overload and potential failure. In the financial sector context, these however should ideally be done within specific contexts (as in the case of stock exchanges) and for limited periods.

Cybersecurity has emerged as a major source of operational, financial, systemic, and national security risk. Before the pandemic, cyber-risk was already being seen by some as being larger than credit and financial risk, particularly as most firms struggled to deal with it. In the current situation, where companies are rapidly moving staff from secure office or government networks to home networks, opportunities for potential breaches by malicious actors increase markedly as do the risks of technical failures.²⁷ We categorise these as ‘Tech-Risks’.²⁸

The second level, from the standpoint of liquidity, focuses on identifying where solvency problems in both the real economy (individuals, firms, governments) and the financial sector (bank runs, etc.) may emerge and deploying financial resources where possible to avoid the emergence of solvency problems as a result of lack of liquidity.

At the heart of any financial sector are wholesale electronic systems which must be carefully monitored for stress by domestic liquidity providers (generally the central bank). In times of crisis, expansive credit lines from major central banks and assistance from international organisations can be essential. This is particularly true if consumers follow rumours on the crisis’ impact on financial institutions and seek to withdraw cash, prompting a banking crisis on top of a health and economic crisis. A similar phenomenon is mirrored in the government sector where mass and rapid unemployment may result in ‘welfare runs’ (as seen in Australia in the early days of the pandemic).²⁹ Government welfare services can quickly become inundated by support seekers, thus overstretching the capacity of the public service³⁰ and immediately skewing fiscal projections.³¹

²⁷ See, Frank Adelman et al, ‘Cyber Risk and Financial Stability: It’s a Small World After All’ (IMF Staff Discussion Notes No 2020/007, 7 December 2020) 5 <<https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2020/12/04/Cyber-Risk-and-Financial-Stability-Its-a-Small-World-After-All-48622>> accessed 6 February 2021.

²⁸ Ross P Buckley et al, ‘TechRisk’ (2020) 1 Singapore Journal of Legal Studies 35-62.

²⁹ ‘If You Need a Payment – Coronavirus (COVID-19)’ (*Australian Government Services*, 9 April 2020) <<https://www.servicesaustralia.gov.au/individuals/subjects/affected-coronavirus-covid-19/if-you-need-payment-coronavirus-covid-19>> accessed 6 February 2021.

³⁰ Luke Henriques-Gomes, ‘Newly Unemployed Australians Queue at Centrelink Offices as MyGov Website Crashes Again’ *The Guardian* (24 March 2020).

³¹ John Kehoe, ‘\$60b Job Keeper Error Caused by Pandemic Fears’ (*Australian Financial Review*, 25 May 2020) <<https://www.afr.com/policy/economy/what-caused-the-60b-jobkeeper-blunder-20200522-p54vou>> accessed 6 February 2021.

Yet liquidity supply alone will not ensure demand in the real economy if consumers choose to save rather than spend or if the choice of goods remains limited (as it will likely be increasingly, due to state intervention in order to prevent panic buying in the face of on-going lockdown policies). Where choice of goods is limited, excess liquidity may well translate into higher prices for the few goods available. At the same time, if consumers choose not to spend, the result may be the opposite: deflationary instead of inflationary. This may be where new digital financial products may help, discussed below in Section III.A.4.

The third level, from the standpoint of solvency of financial institutions, focuses on having closer to real-time reporting in order to coordinate timely responses: to be able to identify emerging solvency issues at as early of a stage as possible to prevent or address excessive build-up. Batch reporting of financial data, for both listed and private companies, is retrospective and fails to capture dynamic financial changes. This pertains, for instance, to all annual, quarterly, or monthly reports required by financial regulators. These numbers, once received by decision makers, are outdated and inadequate for steering an economy through a crisis.

Regulatory technology ('RegTech') and supervisory technology ('SupTech') systems provide important tools in this context.³² For example, historically, on-site supervision has played a central role in financial supervision. During COVID-19 however, this has become impossible, creating the necessity for non-face-to-face interactions not only between financial institutions and their customers but also between financial institutions and regulators (SupTech) and between employees of financial institutions, including their compliance teams as a result of working from home (RegTech). While digital regulatory reporting was already developing rapidly – particularly in the US and the EU³³ – COVID-19 has increased attention globally.³⁴ In addition, technology is playing an important role in health monitoring and compliance – another form of RegTech / SupTech, albeit outside finance: in countries such as Qatar, electronic identity repositories underpin all COVID-19 testing and the streamlining of national vaccination strategies.

³² See, Financial Stability Board, 'Regulatory and Supervisory Issues Relating to Outsourcing and Third-Party Relationships: Discussion Paper' (Discussion Paper, 9 November 2020) 8 <<https://www.fsb.org/2020/11/regulatory-and-supervisory-issues-relating-to-outsourcing-and-third-party-relationships-discussion-paper/>> accessed 6 February 2021.

³³ See, Douglas W Arner, Janos Barberis and Ross P Buckley, 'FinTech, RegTech and the Reconceptualisation of Financial Regulation' (2017) 37 *Northwestern Journal of International Law and Business* 371; Dirk A Zetsche, Douglas W Arner, Ross P Buckley and Rolf H Weber, 'The Future of Data-Driven Finance and RegTech: Lessons from EU Big Bang II' (2019) 25(2) *Stanford Journal of Law, Business & Finance* 245.

³⁴ See, Financial Stability Board, 'The Use of Supervisory and Regulatory Technology by Authorities and Regulated Institutions: Market Developments and Financial Stability Implications' (Report, 9 October 2020) <<https://www.fsb.org/wp-content/uploads/P091020.pdf>> accessed 6 February 2021.

In the present crisis, concerns are not emanating from financial institutions but rather from the potential impact of the crisis on governments, firms and individuals and from potential knock-on impacts on the financial sector.³⁵ Given the very rapid change in economic conditions, systems for collecting and analysing data and its impact through RegTech and SupTech can offer more granular and real time information about financial health.³⁶ Through the same infrastructure, if in place for longer periods, regulators could require systemically significant institutions to report core data that policymakers could subsequently use for economic projections and crisis modelling.³⁷ Regrettably, while RegTech and SupTech systems could provide vital tools in this respect, they cannot be put in place quickly due to the disruption typically associated with upgrading legacy systems, making the implementation of RegTech and SupTech solutions difficult amidst a major crisis. However, going forward, this is a major opportunity for legal and regulatory reform.

The fourth level, from the standpoint of the financial health of individuals, businesses and governments, focuses on leveraging existing fintech solutions. These solutions are primarily digital payments, digital commerce related (with respect to delivery services for necessities), and digital funding avenues (with respect to rapidly growing sectors such as online education). The increased reliance on grocery and food delivery services³⁸ has proved to be both a blessing and a curse. On the one hand, these services enable physical distancing and self-isolation. If these food delivery systems are unable to address the increased demand, however, consumers may lose faith in such systems and panic buying in physical supermarkets can result. Additionally, if these delivery systems are poorly designed or implemented or if delivery staff are under-trained or over-worked, these systems can (and have) put workers at risk with tragic consequences.³⁹ Communication through online learning, tutoring, edu-

³⁵ Douglas W Arner, Emiliós Avgouleas and Evan Gibson, 'Financial Stability, Resolution of Systemic Banking Crises and COVID-19: Toward an Appropriate Role for Public Support and Bailouts' (2020) University of Hong Kong Faculty of Law Research Paper No 2020/044 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3664523> accessed 6 February 2021.

³⁶ Douglas W Arner, Janos Barberis and Ross P Buckley, *The RegTech Book* (Wiley 2019); Arner, Barberis and Buckley (n 33) 375; Luca Enriques, 'Financial Supervisors and Regtech: Four Roles and Four Challenges' (2017) 53 *Revue Trimestrielle de Droit Financier*.

³⁷ Sylvia Shepperson, 'RegTech the Smart Future for Model Risk Management' (*FinExtra*, 21 June 2018) <<https://www.finextra.com/blogposting/15496/regtech---the-smart-future-for-model-risk-management>> accessed 6 February 2021.

³⁸ Marco Chiappetta, 'Uber Eats Demand Soars Due to COVID-19 Crisis' (*Forbes*, 25 March 2020) <<https://www.forbes.com/sites/marcochiappetta/2020/03/25/uber-eats-demand-soars-due-to-covid-19-crisis/#3fe5bd54580c>> accessed 6 February 2021; Mary Hanbury, 'UK Grocery Chains Add Hundreds of Thousands of Delivery Slots for Online Orders but Admit that They Can't Keep up with Demand' (*Business Insider UK*, 8 April 2020) <<https://www.businessinsider.com/tesco-ocado-sainsburys-cant-keep-up-with-surg-ing-demand-amid-coronavirus-4?r=AU&IR=T>> accessed 6 February 2021.

³⁹ Naaman Zhou, 'NSW Government Announces Taskforce to Investigate Food Delivery Deaths' (*The Guardian* (24 November 2020); Amien Essif, 'Pressure Mounts on Food Delivery Workers amid COVID-19' (*Deutsche Welle*, 23 March 2020) <<https://www.dw.com/en/>

cation, and marketing has evolved with incredible rapidity across the world and much of this will not be reversed even after the pandemic is resolved. This trend will likely continue requiring further financial resources to support such technological infrastructure growth.⁴⁰

At the core is financial stability. The financial system has to be regulated and supported to function properly in order to achieve its core functions of supporting economic and other activities; and financial crises need to be avoided, if possible, or ameliorated when they do occur.⁴¹ Resulting from regulatory reforms in the wake of 2008, and the emergence of fintech and more generally the digital transformation of finance over the past decade, the impact of the pandemic on the financial sector has not amplified the COVID-19 health crisis. In fact, digital finance is emerging as one of the pillars supporting financial stability and underpinning the economic and social responses to the crisis.

III. REDUCING ECONOMIC IMPACT: MAXIMISING DIGITAL CHANNELS

Digital finance offers potentially important tools in directing resources quickly and efficiently to the stakeholders that need them the most. In particular, we focus on the strategies and solutions to mitigate economic and human impact.

In an existential sustainability crisis such as the COVID-19 pandemic, the initial economic, social, human, and financial impact results from short-term factors. As a crisis extends longer in time, these can, at some point, turn into structural factors, which in turn require different strategies, and this in fact seems to be happening in a number of areas as the COVID-19 pandemic has evolved from a short-term shock to a longer term battle. Digital financial tools are capable of achieving traditional crisis management objectives with greater potency and accuracy than was historically possible.⁴² This may well be one advantage of governments in the current crisis not previously available. The data-driven nature of digital finance provides policymakers with the ability to structure and scale stimulus with precision.⁴³ The potential benefits are obviously apparent. The core questions, however, are whether the information is available, readable and in front of the decision makers and if the technical

pressure-mounts-on-food-delivery-workers-amid-covid-19/a-52848505> accessed 6 February 2021; Alex Hern, 'Amazon Sales of 'Non-essentials' Hit by French Court Ruling' *The Guardian* (16 April 2020).

⁴⁰ Fergus Hunter and Jordan Baker, 'Uni Bosses Predict Permanent Shift to Online Learning but Not a 'Full-Scale Revolution' *The Sydney Morning Herald* (11 April 2020).

⁴¹ Arner (n 24).

⁴² Arner, Barberis and Buckley (n 23).

⁴³ Jessica Kent, 'Big Data Analytics Show COVID-19 Spread, Outcomes by Region' (*Health IT Analytics*, 21 September 2020) <<https://healthitanalytics.com/news/big-data-analytics-show-covid-19-spread-outcomes-by-region>> accessed 6 February 2021.

capability is sufficiently mature to meet the challenge. Consolidating, curating, and monitoring collected information is a core pillar of crisis-response that may well be tragically revealed to be lacking in the current pandemic (and the need for effective systems to do this may well prove to be one of the major policy lessons from this pandemic).

A. Public and Private Directed Financial Assistance

In times of upheaval, people need the means to secure the essentials of food, shelter and clothing. As long as basic market conditions hold, and the situation has not deteriorated into riots and looting, commercial exchange and public assistance will remain the only legitimate ways to secure such essentials. Digital financial platforms, and digital wallets in particular, can deliver funds to those in need rapidly and accurately. In recent years, financial technology has spearheaded the financial inclusion agenda by enabling more people than ever before to access financial services through their mobile devices in China, India, and large parts of Africa. In terms of publicly directed assistance and crisis fallout alleviation, the dynamics of the traditional public/private divide are also being witnessed upon a new axis. That new dimension is one of incumbent banks or financial institutions (Big-Fin) versus giant technology firms (Big-Tech) moving into the financial market.

In the context of China for example, banks have been criticised for their slow responses to ease the financial burden on virus victims.⁴⁴ Although several Chinese banks⁴⁵ responded to the crisis with mortgage relief, credit card payment holidays and corporate loan readjustments, they have been criticised for taking too long to act. In many other major economies, it has taken even longer for banks and the financial sector to react – and they have done so only after the government has taken the lead.⁴⁶ In the EU, this has come in the form of the European Council amending bank holding requirements to encourage and facilitate lending.⁴⁷ These changes to bank rules are in addition to a

⁴⁴ Val Law, 'Big Tech Beat Banks in COVID-19 Response' (*Finews*, 25 February 2020) <<https://www.finews.asia/finance/31047-big-techs-corona-crisis-covid19-hong-kong-china-singapore-response-fintech-alibaba-boc-hsbc-stanchart-axa?start=1>> accessed 6 February 2021.

⁴⁵ Chad Bray and Enoch Yiu, 'Hong Kong Banks to Offer Relief on Mortgages, Credit Cards, Corporate Loans as Coronavirus Outbreak Weighs on Economy' *South China Morning Post* (6 February 2020).

⁴⁶ David Taylor, 'The Big Four Banks are Letting Borrowers Hit Pause on their Payments, But This Is No Mortgage Holiday' *ABC News* (21 March 2020) <<https://www.abc.net.au/news/2020-03-21/mortgage-pause-coronavirus-nab-commonwealth-anz-westpac/12076690>> accessed 6 February 2021.

⁴⁷ 'COVID-19: Council Adopts Exceptional Rules To Facilitate Bank Lending in the EU' (*Council of the European Union*, 24 June 2020) <<https://www.consilium.europa.eu/en/press/press-releases/2020/06/24/covid-19-council-adopts-exceptional-rules-to-facilitate-bank-lending-in-the-eu/>> accessed 6 February 2021.

multi-trillion Euro economic rescue package⁴⁸ and large crisis support and large economic stimulus packages within EU member states, particularly in Germany.⁴⁹ While this European initiative and American relief measures (the ‘CARES Act’) came within ‘weeks and months’ of the discovery of the virus, global BigTech companies, such as Amazon and Alibaba, have accustomed the public to rapid and customised service in nearly all realms of digital life.⁵⁰ We now live in a world of on-demand entertainment and Amazon Prime time-frames⁵¹ in which these government and bank response-times appear too slow. Whether these government response times were the consequence of cautious policy evaluation or decision-making or logistical bottlenecks, there is a role for more nimble fintech firms to support governments – at least in the roll out phase of policy implementation.⁵²

As noted by finews.asia:

As more technology companies gain digital banking licenses, banks can no longer operate as they used to. They also cannot claim to be the source of vital ‘life-lines’ for their customers, if they do not demonstrate the timeliness of actions during critical times. If incumbent banks want to have a place in their clients’ hearts, they must respond in the way that big techs do, and see themselves as part of the ecosystems they serve.⁵³

Many governments around the world have announced direct government stimulus packages to limit broad economic hardship and avert a sharp

⁴⁸ ‘COVID-19: The EU’s Response to the Economic Fallout’ (*Council of the European Union*, November 2020) <<https://www.consilium.europa.eu/en/policies/coronavirus/covid-19-economy/>> accessed 6 February 2021.

⁴⁹ See, ‘Protective Shield to Manage the Coronavirus Pandemic’ (*Federal Ministry of Finance*, November 2020) <<https://www.bundesfinanzministerium.de/Web/EN/Issues/Priority-Issues/Corona/corona.html#:~:text=The%20protective%20shield%20to%20manage,as%20of%2017%20November%202020>> accessed 6 February 2021; ‘Emerging From the Crisis with Full Strength’ (*Federal Ministry of Finance*, 4 June 2020) <<https://www.bundesfinanzministerium.de/Content/EN/Standardartikel/Topics/Public-Finances/Articles/2020-06-04-fiscal-package.html>> accessed 6 February 2021.

⁵⁰ Zetzsche, Buckley and Arner (n 12) 191-192.

⁵¹ Brian Solis, ‘Impatience is a Virtue: How the On-Demand Economy is Making Mobile Consumers Impatient’ (*Forbes*, 20 November 2017) <<https://www.forbes.com/sites/briansolis/2017/11/20/impatience-is-a-virtue-how-the-on-demand-economy-is-making-mobile-consumers-impatient/#135bde70344c>> accessed 6 February 2021.

⁵² See, Dariusz Wójcik and Stefanos Ioannou, ‘COVID-19 and Finance: Market Developments So Far and Potential Impacts on the Financial Sector and Centres’ (2020) 111(3) *Tijdschrift voor economische en sociale geografie* 387, 395.

⁵³ Law (n 44). However, there have been indications that consumer demand has slowed during the COVID-19 pandemic – see, Johannes Ehrentraud, Denise Garcia Ocampo and Camila Quevedo Vega, ‘Regulating Fintech Financing: Digital Banks and Fintech Platforms’ (2020) *Bank for International Settlements Financial Stability Institute Insights No 2020/27 4* <<https://www.bis.org/fsi/publ/insights27.htm>> accessed 6 February 2021.

economic downturn. Some of these programmes, such as Australia's 'Job Keeper' program, are premised on detailed information cross-referenced with other data points.⁵⁴ As evidenced by the unprecedented global government stimulus packages, policymakers acknowledge the pandemic will result in a broad economic tsunami rather than disruption in only certain limited sectors (i.e., travel, hospitality). Many governments have rolled out initiatives including those seeking to ensure sufficient liquidity to support markets, instil business and consumer confidence (or at least allay fear) and stimulate demand.

In addressing the economic impact, the starting point is to identify market constraints and those groups most likely to be impacted. Effective policies and public programmes require sufficient calibration to target supply side obstacles in the provision of those essential needs that underpin social cohesion (food security, hygiene, and medical supplies), in unison with stimulating aggregate demand. These targeted measures will seek to address issues relating to liquidity (temporary loss of income, business, etc.) and solvency. Digital finance offers important tools.

Impact has been widespread across individuals, Small and Medium Enterprises ('SMEs'), larger firms, and public institutions (such as hospitals).⁵⁵ Impact on governments and the financial sector is so far limited but both can be expected to increase dramatically the longer the crisis continues as tax revenues, in particular, fall precipitately, and/or as non-performing loan volumes increase.

In addition to providing mechanisms for monitoring financial and economic conditions, digital finance offers the potential to directly target financial resources rapidly to those experiencing the greatest impact. The combination of digital identity frameworks and widespread availability of financial and mobile money accounts, along with interoperable electronic payment systems

⁵⁴ Such as: (1) How long an employee has been in their position (must be at least 1 year); (2) Turnover thresholds of employers (under or over \$1 billion); (3) Percentage of business downturn since 1 March 2020 (under \$1 billion must be at least 30% downturn in turnover and over \$1 billion – 50% downturn: 'JobKeeper Payments for Employers and Employees' (*Australian Government Business*, 20 April 2020) <<https://www.business.gov.au/risk-management/emergency-management/coronavirus-information-and-support-for-business/jobkeeper-payment>> accessed 6 February 2021.

⁵⁵ Michaela Boland, 'Coronavirus Has Shut Down Australia's Arts Industry but Artists Say the Government Has Ignored Them' *ABC News*, (8 April 2020) <<https://www.abc.net.au/news/2020-04-08/arts-sector-say-need-emergency-funding-to-survive-shutdown/12130398>> accessed 6 February 2021; Jade Macmillan, 'Arts Industry to Receive \$250 million Coronavirus Rescue Package From Federal Government' *ABC News*, (25 June 2020) <<https://www.abc.net.au/news/2020-06-25/arts-industry-to-receive-250-million-coronavirus-rescue-package/12390282>> accessed 6 February 2021; 'A Look at the Hospitals Battling Coronavirus Around the Globe' *ABC News*, (3 April 2020) <<https://www.abc.net.au/news/2020-04-03/look-at-the-hospitals-around-globe-coronavirus-covid-19/12117594>> accessed 6 February 2021.

provide great potential for delivering resources directly across an entire society.⁵⁶ In countries where such systems are in place, they can provide the foundations for the design of appropriate programmes and the delivery of financial resources using algorithms prioritising different factors such as age, health, social commitment, professional qualifications, and others. For the time being at least, it appears the politics surrounding these types of social programmes and assessments are less polarised than would normally be the case, and more conciliatory.

Governments, Non-Governmental Organisations ('NGOs'), and international organisations have to work with payment, financial and telecommunications providers to use whatever resources are available in terms of rapid targeted delivery. Cheques mailed over a period of months clearly lack the desired level of effectiveness.

The table below sets out a sample of digital tools available in various countries, how they may be relevant and whom they could be used to assist.

Tools & Examples			
<i>Tool</i>	<i>Example</i>	<i>Relevance</i>	<i>Beneficiary</i>
Digital Identity	Aadhaar	Identification of individual health status	Government / Public
Transfer	e-Tunai Rakyat	Instant disbursement of fund to beneficiary in closed loop	Public / SME
Peer-to-Peer	Lending Club	Direct lending origination & ROI above central banks	SME / Public
Crowdfunding	GoFundMe / Kickstarter	Pre-finance products using public support	SME / Public
Invoice factoring	Funding Societies	Unlocking future income to limit liquidity issues	SME
AML / KYC	Comply Advantage	Scalable identification of source of fund of micro-donation	NGO

⁵⁶ Douglas W Arner, Ross P Buckley, Dirk A Zetzsche and Ghiyazuddin Mohammad, 'FinTech for Financial Inclusion: A Framework for Digital Financial Transformation' (Special Report, Alliance for Financial Inclusion/Group of 24, September 2018); Douglas W Arner et al, 'The Identity Challenge in Finance: From Analogue Identity to Digitised Identification to Digital KYC Utilities' (2019) 20 European Business Organisation Law Review 55.

Tools & Examples			
<i>Tool</i>	<i>Example</i>	<i>Relevance</i>	<i>Beneficiary</i>
InsurTech	Ping An	Shorter reimbursement of cost to provider / claimant	Public / Hospitals
Sharing economy	Uber / Grab / Gojek	Mobilising under-utilised assets & coordinating resources	Government / SME

For SMEs, short term tools include the capacity to unlock future income by looking at invoice factoring solutions. However, this requires digitisation of invoices, which might not be commonplace in developing markets.⁵⁷ Moreover, in developed countries, many businesses have lost all future income due to the cessation of client orders.⁵⁸ Another technology approach heavily reliant on current and accurate information includes strategic cash injections aimed at businesses to avoid mass unemployment, loss of infrastructure and deterioration of workforce skills, thus preserving readiness for a rapid kick-start as the health crises passes. For instance, states could rely on tax authorities to trigger reverse transactions based on the latest value-added tax, corporate tax or income / salary tax records. Certain types of businesses may also be suitable for crowdfunding (see below). Governments that have at various times limited the use of crowdfunding platforms in their jurisdictions could support suitable campaigns by officially declaring their conditional regulatory blessing.

1. *Digital Identity*

Digitally identifying people by connecting to official repositories of identity data will continue to grow in importance. This can enable governments to implement remedial policies particularly by direct fiscal assistance. The financial crisis of 2008 saw substantial resources in some jurisdictions wasted through the misallocation of stimulus payments to deceased or non-existent citizens.⁵⁹ Digital identity verification and authentication should ensure that only intended recipients receive stimulus payments. The threat of fraud and identity theft can be greatly minimised through the strengthening and support of digital

⁵⁷ Financial Stability Board, 'BigTech firms in finance in emerging market and developing economies' (Report to the G20, 12 October 2020) 7-8.

⁵⁸ 'Business Impact of COVID-19 Survey (BICS) Results' (*Office for National Statistics*, 2020) <<https://www.ons.gov.uk/economy/economicoutputandproductivity/output/datasets/businessimpactofcovid19surveybicsresults>> accessed 6 February 2021; 'Business Insights and Impacts on the UK' (*Office for National Statistics*, 19 November 2020) <<https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/coronavirusandtheeconomicimpactsontheuk/latest>> accessed 6 February 2021.

⁵⁹ Bonnie Malkin, 'Thousands of Dead Australians Get \$900 Stimulus Cheques' *The Telegraph* (28 May 2009).

identity infrastructure.⁶⁰ It is important to note however, that authentication and verification of an identity via a digital channel should be the focus, and not the creation of separate ‘digital identities’ or avatars. As a result of the necessity of non-face-to-face on-boarding and other activities, COVID-19 has dramatically highlighted the importance and role of sovereign digital identity systems, particularly in terms of constraining money laundering and terrorist financing.

2. *Behaviour Management*

The uncharacteristic grocery store panics that have been witnessed in numerous developed economies are in many cases products of the digital dissemination of information. The dissemination of ‘fake news’ and misinformation through social media has been an issue of international significance for several years.⁶¹ The overlap between social media and digital finance has been growing with services such as ‘WhatsApp Pay’ and ‘WeChat Pay’ emerging as extensions of popular messaging platforms. As such payment platforms develop further and become more widely adopted, this overlap creates an opportunity for the correlation of message dissemination patterns with purchasing behaviour, potentially signalling early-stage panic shopping and even pinpointing the products the panic focuses upon (hand sanitizer, toilet paper, pasta, etc.).⁶²

The social distancing and quarantine policies that have been adopted in many parts of the world have also seen a massive increase in e-commerce. The use of digital platforms to shop, pay, and organise delivery of all types of goods grew exponentially across 2020.⁶³ Depending on how long these policies remain in place, and how well the delivery services work, they will evoke behavioural and purchasing pattern change. A 2010 University College

⁶⁰ Arner, Buckley, and Zetzsche (n 56); Arner et al (n 56).

⁶¹ Kalinga Seneviratne *Myth of ‘Free Media’ and Fake News in the Post-Truth Era* (Sage 2020) 232.

⁶² Kiran Parashar, ‘WhatsApp Forward Causes Panic Buying in Bengaluru’ *The Times of India* (11 April 2020); ‘WHO Health Alert brings COVID-19 facts to billions via WhatsApp’ (*World Health Organisation*, 21 August 2020) <<https://www.who.int/news-room/feature-stories/detail/who-health-alert-brings-covid-19-facts-to-billions-via-whatsapp>> accessed 6 February 2021.

⁶³ For example, in Australia, online shopping in the following categories recorded year-on-year increases in December 2020: food & liquor – 50% increase since December 2019; fashion – 37% increase since December 2019; home and garden products – 36% increase since December 2019: see, Yolanda Redrup, ‘AusPost Delivers as Online Shopping Hits New Heights’ (*Financial Review*, 11 January 2021) <<https://www.afr.com/companies/retail/auspost-delivers-as-online-shopping-hits-new-heights-20210110-p56syc>> accessed 6 February 2021. In Ireland, the Central Bank of Ireland recorded a 21% year-on-year increase in December 2020 in relation to online credit and debit card usage: see, ‘Credit and Debit Card Statistics – December 2020’ (*Central Bank of Ireland*, 29 January 2021) <<https://www.centralbank.ie/docs/default-source/statistics/data-and-analysis/credit-and-banking-statistics/credit-and-debit-card-statistics/credit-and-debit-card-statistics-december-2020.pdf?sfvrsn=5>> accessed 6 February 2021.

of London psychology study concluded that it takes 66 days to create a habit.⁶⁴ What begins as a temporary lifestyle change, given enough time, can become a new daily norm. Many of these behavioural changes will stick.

Digital purchasing platforms are being used to limit the freedom of shoppers to bulk buy through the implementation of quantity quotas. The growth in and sophistication of app-based and online budgeting tools has seen the potential of identifying and categorising financial transactions improve remarkably in recent years. Open banking platforms that provide third parties with customer banking information could also be leveraged to identify purchase behaviour and aggregate data for panic identification and quota implementation. As Artificial Intelligence ('AI') analytics develop, such sources of information could be easily correlated with other data sets (for example, social media communications) to provide even more specific measures of public sentiment.⁶⁵

The sweeping use of behaviour management in the form of lockdowns, restrictions on movement, and mask-wearing imposed by governments may continue for longer than strictly necessary. If the population does not believe in the rationale of behaviour management protocols, as seen in many parts of the world, a backlash can occur. Therefore, behaviour management needs to be done in an open and transparent way where the population understands and acknowledges its rationale.

3. *Information Sharing*

Information and trusted data are the life blood of the digital economy. From advertising to public health to detection of criminal activities, the ability to access and use information is critical. As in war, in this crisis, accurate and factual information can mean life or death. Establishing a well-funded, national coordinating body – such as a Health Stability Board – as a crisis management tool could ensure timely information exchange – especially between the public and private sectors. Emergency government powers may be used to overcome data privacy and protection obstacles and intensify information exchange on health *and* financial / economic matters. Legal frameworks that mediate principles of data sharing and broader digital governance policies will be imperative within such an approach.

The wisdom of crowds is perhaps most apparent in the context of mass consumer behaviour. The purchasing behaviour of the consuming public provides real-time indications of trends and fashions and can readily highlight public consternation and full-blown panics. Using digital financing tools to aggregate

⁶⁴ Philippa Lally et al, 'How Habits Are Formed: Modelling Habit Formation in the Real World' (2010) 40 *European Journal of Social Psychology* 998.

⁶⁵ Dirk A Zetzsche et al, 'From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance' (2018) 14(2) *New York University Journal of Law & Business* 393.

purchase information (of medical supplies, for example, or toilet paper) can help identify emerging panics.

On a more immediate level, various online communities around the world have begun to organically coordinate and crowdsource information in order to help efficiently design, manufacture, and distribute medical supplies where they are needed most.⁶⁶ These groups include engineers, chemists, logistics experts, and many other professionals as discussions and ideas are moderated and filtered through various socially coordinated channels.

4. *Collective Decision-Making*

Corporate decisions often depend on collective decision-making by boards and general meetings of shareholders. This could, among other things, relate to the disbursement of dividends, share buy-backs, or recapitalisation.⁶⁷ Keeping the economy afloat has required substitutes for in-person meetings. This is why many Parliaments around the globe have now provided for digital, instead of in-person meetings in corporate governance rules. In particular, most advanced economies, by way of crisis legislation, have allowed for some type of remote voting and/or virtual shareholder meetings.⁶⁸

5. *Tokenisation*

Liquidity supply alone will not ensure demand in the real economy if choice of goods remains limited. Where choice of goods is limited, excess liquidity may translate into higher prices for the goods available. Where real goods are limited, digitally created financial goods (by way of token offerings) or new digital services (such as entertainment and news) could partially consume the excess liquidity in an orderly manner,⁶⁹ but mis-selling and fraud may be more likely. Tokens, online banking, and mobile money schemes could also be used to channel funds faster to consumers to provide financial support and to promote economic activity.

⁶⁶ James Crowley, 'The Futuristic Solutions the Internet is Crowdsourcing to Cure Coronavirus' (*Newsweek*, 18 March 2020) <<https://www.newsweek.com/crowdsourcing-solutions-coronavirus-covid-19-facebook-1493075>> accessed 6 February 2021.

⁶⁷ Dirk A Zetzsche et al, 'The COVID-19-Crisis and Company Law - Towards Virtual Shareholder Meetings' (2020) University of Luxembourg Faculty of Law, Economics & Finance WPS Research Paper 2020/007 <<https://ssrn.com/abstract=3576707>> accessed 6 February 2021.

⁶⁸ *ibid*; Douglas K Chia, 'Key Takeaways and Best Practices from Virtual Shareholders Meetings in 2020' (*Harvard Law School Forum on Corporate Governance*, 2 July 2020) <<https://corpgov.law.harvard.edu/2020/07/02/key-takeaways-and-best-practices-from-virtual-shareholders-meetings-in-2020/>> accessed 6 February 2021.

⁶⁹ Lewis Cohen and Andreas Freund, 'Blockchain in Public Goods Allocation: Unlocking Economic Value and Equitable Distribution through Token-Based Markets' (Consensus White Paper, 4 November 2019).

IV. HUMAN IMPACT: DIGITAL FINANCE IN TIMES OF DISRUPTION

Digital finance can play an important role in addressing health and human impact in an existential sustainability crisis such as COVID-19. In addition, digital finance plays a central role in addressing the financial and economic impact and can provide important tools to support health and human impact strategies and policies.

A. Health Risk Management

In particular, digital finance provides tools for monitoring potential epidemic outbreaks and mechanisms to direct the necessary financial resources to health care providers and others, for them to discharge their functions.⁷⁰

Telecoms and search data in particular can be valuable. Beyond this, the ability to deliver medical services and advice remotely (“telemedicine”) requires reliable communications infrastructure (particularly internet and mobile but also fixed line) and electronic payment mechanisms.

And, of course, e-tokens can be used for disseminating scarce goods and services such as medicines and medical support to those with the greatest need.

From the standpoint of social distancing, e-commerce is vital. In the early stages of the crisis, this was widely available in developed countries, which were those worst hit by this crisis. However, as the pandemic has moved strongly into some developing countries, the picture has become more problematic. Where e-commerce is present, technology can facilitate delivery without human contact between delivery service provider and recipient. Likewise, fintech can allow all manner of sector specific innovations to flourish. The table below sets out examples of the range of initiatives where fintech is an underlying driver of disruption and innovation.

Tools & Examples			
<i>Tool</i>	<i>Example</i>	<i>Relevance</i>	<i>Beneficiary</i>
E-Commerce	Amazon Prime	Provide logistic delivery network for deployment of material	Public / SME
HealthTech	Babylon	Tele-medicine in order to evaluate individual situation	Public / Hospitals

⁷⁰ Zetzsche, Buckley and Arner (n 12).

Tools & Examples			
<i>Tool</i>	<i>Example</i>	<i>Relevance</i>	<i>Beneficiary</i>
EdTech	edX	SME digitisation to access fintech services in order to process online payments on these platforms	SME
Alternative Data	Klarna	Re-evaluate credit scoring methods with dynamic sources	Public / SME
Gig Economy	Deliveroo	Leverage on mobile workforce to reach isolated people	Public
WealthTech	Trezeo	Smoothen irregular income with investment product	Public
Mobile Phones	Demyst Data	Map of individual movement to estimate cluster spread	Public / Hospitals
ISP	RTR (AT)	Adjust bandwidth-cap to maintain service connectivity	Government/ SME

During the crisis, governments have looked increasingly to digital identity for a dynamic understanding of the financial and personal health of individuals. In particular, as individuals recover health-wise, it becomes increasingly important to redirect our focus back to the economic crisis. We also need to consider alternative technological approaches for monitoring. For instance, all people who have developed immunity could be assigned a personalised token with key health and qualification data that comes with a greater degree of personal freedom.⁷¹ Depending on priorities and needs, token holders may even be enabled or required to assist elderly and persons at risk and/or perform crucial economic and production functions. Through the token, the respective priorities could be adjusted short term, taking into account the region, qualifications, and social commitments of token holders.

B. Insurance

The availability of insurance (medical, travel, pet) via online platforms has grown in recent years.⁷² As COVID-19 has spread, the demand for insurance has also increased. Notably however, the declaration of COVID-19 as a pandemic rendered many existing travel insurance policies ineffectual and left

⁷¹ Paul Mozur, Raymond Zhong and Aaron Krolik, 'In Coronavirus Fight, China Gives Citizens a Colour Code, with Red Flags' *The New York Times* (1 March 2020); Heather Murphy, '14 Days with a Quarantine Tracker Wristband: Does it Even Work?' *The New York Times* (8 April 2020).

⁷² Sabine Gebert-Persson et al, 'Online Insurance Claims: When More than Trust Matters' (2019) 37(2) *International Journal of Bank Marketing* 579, 580.

many others in grey areas in relation to claims.⁷³ In the US, one of the most contentious areas of insurance that has emerged due to the pandemic is business interruption insurance arising from COVID-19.⁷⁴ It is expected that such disputes will continue to arise in the wake of the economic fallout and ongoing lockdowns.

In order to alleviate distress and simplify the resolution of insurance-related financial disputes, online dispute resolution services, such as the private UK service ‘Resolver’,⁷⁵ may have a vital role in the recovery process (particularly in light of the likely ongoing social distancing guidelines).

Attaining insurance through digital platforms has never been easier. The responsiveness of InsurTech platforms to the epidemic has been most visible in China, especially with ‘WeSure’ (the insurance arm of Chinese technology giant ‘Tencent’). WeSure has rapidly launched a suite of insurance products⁷⁶ aimed at protecting potential COVID-19 victims (covering a wide scope of potential policyholders from medical personnel to SMEs). ‘Xiang Hu Bao’, a Chinese mutual aid platform (backed by Ant Financial) has piloted the use of blockchain data verification to fast-track payments to virus victims and avoid face-to-face transactions.⁷⁷

WeSure has even launched a free insurance policy,⁷⁸ open to all Chinese citizens up to 65 years of age, as part of its corporate social responsibility obligations to further support the Chinese people and the fight against the virus. Beyond being a shrewd financial move, this has clearly communicated the

⁷³ Anna Tims, ‘Coronavirus: Travel Insurance Policies Not Paying Out in a Crisis’ *The Guardian* (31 March 2020); Pat McGrath, ‘TAL Drops Plans for Coronavirus Exclusion Clause on Life Insurance’ *ABC News*, (8 April 2020) <<https://www.abc.net.au/news/2020-04-08/tal-backflips-coronavirus-exclusion-clauses-for-life-insurance/12130484>> accessed 6 February 2021.

⁷⁴ Rachel E Keen and Jonathan Reid Reich, ‘COVID-19 Shutdowns, Related Litigation Put Pressure on Business Interruption Insurers’ (2020) 10(37) *The National Law Review* <<https://www.natlawreview.com/article/covid-19-shutdowns-related-litigation-put-pressure-business-interruption-insurers>> accessed 6 February 2021.

⁷⁵ Detailed information on the services ‘Resolver’ offers is available at: ‘Insurance Complaints’ (*Resolver*, 2020) <<https://www.resolver.co.uk/complaints/insurance-complaints>> accessed 6 February 2021.

⁷⁶ ‘WeSure Launches Novel Coronavirus Pneumonia Insurance Covering 15 Million People against Outbreak of Covid-19’ (*PRNewswire*, 15 February 2020) <<https://www.finanzen.ch/nachrichten/aktien/wesure-launches-novel-coronavirus-pneumonia-insurance-covering-15-million-people-against-outbreak-of-covid-19-1028907657>> accessed 6 February 2021.

⁷⁷ Georgina Lee, ‘Insurance Service Providers Rely on Blockchain to Fast Track Claims Payout amid Coronavirus Outbreak’ *South China Morning Post* (9 February 2020).

⁷⁸ Charlie Wood, ‘Free Coronavirus Cover Offered by Insurtech WeSure’ (*Reinsurance News*, 17 February 2020) <<https://www.reinsurancene.ws/free-coronavirus-cover-offered-by-insurtech-wesure/>> accessed 6 February 2021; ‘Tencent WeSure CEO Alan Lau: COVID-19 Spurs Insurance Demand in China’ (*PR Newswire*, 5 June 2020) <<https://www.prnewswire.com/news-releases/tencent-wesure-ceo-alan-lau-covid-19-spurs-insurance-demand-in-china-301071273.html>> accessed 6 February 2021.

message that “you are safe in our eco-system” – blurring the lines between the real and virtual worlds in a way sure to favour BigTech organisations.

C. Electronic and Contactless Payments

Beyond the need to avoid face-to-face transactions and payments as a result of the crisis, the norms of social interaction are shifting due to concerns over the spread of the virus. People across the world have been instructed to minimise physical contact in the course of their everyday lives. Digital wallets supporting contactless payment and other forms of contactless transacting are proving to be faster and more convenient than traditional cash or card transactions, as well as more hygienic.⁷⁹ The decades-old trend towards a cashless society now has an even more compelling driver. This is a field ripe for further, and ongoing, behavioural change.

D. Crowdfunding

Crowdfunding initiatives (and their supporting platforms)⁸⁰ are emerging as vital decentralised lifelines⁸¹ in times when the capabilities of centralised governmental control are being severely tested. Members of the public who might otherwise feel powerless in the face of the virus, have committed millions of dollars to COVID-19-related crowdfunded causes – these include everything from a high profile crowdfunding campaign launched by football superstar Zlatan Ibrahimović,⁸² to less high-profile causes regarding people facing economic hardship due to virus-related job loss. Even the Centre for Disease Control (‘CDC’) turned to crowdfunding,⁸³ whilst a ‘GoFundMe’ page for the San Raffaele hospital in Milan raised almost 4.5 million Euros before the

⁷⁹ Although the risks of viral transmission by the handling of cash have at times been overstated: Raphael Auer, Giulio Cornelli and Jon Frost, ‘Covid-19, Cash and the Future of Payments’ (2020) 3 BIS Bulletin <<https://www.bis.org/publ/bisbull03.htm>> accessed 6 February 2021; *See also*, Serhan Cevik, ‘Dirty Money: Does the Risk of Infectious Disease Lower Demand for Cash?’ (2020) International Monetary Fund Working Paper No 2020/255 11 <<https://www.imf.org/en/Publications/WP/Issues/2020/11/20/Dirty-Money-Does-the-Risk-of-Infectious-Disease-Lower-Demand-for-Cash-49877>> accessed 6 February 2021.

⁸⁰ John Armour and Luca Enriques, ‘The Promise and Perils of Crowdfunding: Between Corporate Finance and Consumer Contracts’ (2018) 81(1) *Modern Law Review* 51; Dirk Zetzsche and Christina Preiner, ‘Cross-border Crowdfunding: Towards a Single Crowdfunding and Crowd-investing Market for Europe’ (2018) 19(2) *European Business Organisation Law Review* 217.

⁸¹ Nicholas Kulish, “‘People Need Immediate Relief,’ and Online Donors Make it Happen” *The New York Times* (16 March 2020).

⁸² ‘Kick the Virus Away!’ (*GoFundMe*, 18 March 2020) <<https://www.gofundme.com/f/kick-the-virus-away>> accessed 8 February 2021.

⁸³ ‘CDC Foundation Launches Crowdfunding Campaign to Extend and Accelerate Public Health Coronavirus Response’ (*CDC Foundation*, 12 March 2020) <<https://www.cdcfoundation.org/pr/2020/cdc-foundation-launches-coronavirus-covid19-crowdfunding-campaign-charidy>> accessed 8 February 2021.

organiser stopped seeking new donations.⁸⁴ Leading Ethereum crowdfunding platform ‘Gitcoin’ also held a public health focused funding round.⁸⁵

Although start-up funding via crowdfunding platforms will diminish due to the virus,⁸⁶ the platforms themselves are proving useful and versatile. The case can even be made that crowdfunding is in fact helping the fight against COVID-19 through its ability to financially support, for example, frontline medical staff who have contracted the virus and been forced into self-isolation-without pay.⁸⁷

In this global crisis in a globalised world, crowdfunding is connecting urban populations to their local businesses, parks,⁸⁸ entertainment venues, and sports clubs - strengthening community bonds that in recent decades may have frayed. Major technology players are using their platforms to support this organic outpouring of community support underscoring an important dimension to digital finance.⁸⁹

Ironically, digital financial platforms, so synonymous with global capital and transnational finance, are in some ways having grassroots impact and rebuilding social community bonds in a context where faith in globalisation is being tested. Digital token offerings are playing into this broader trend, as individuals are able to use such technologies to invest in crowdfunding initiatives within their local or regional communities and economies, demonstrating much needed solidarity.

⁸⁴ ‘Coronavirus, Rafforziamo la Terapia Intensiva’ (*GoFundMe*, 9 March 2020) <<https://www.gofundme.com/f/coronavirus-terapia-intensiva>> accessed 8 February 2021.

⁸⁵ Mike Dalton, ‘Ethereum’s Largest Crowdfunding Platform to Combat Coronavirus with Grants’ (*CryptoBriefing*, 14 March 2020) <<https://cryptobriefing.com/ethereums-biggest-crowdfunding-platform-combat-coronavirus-grants/>> accessed 8 February 2021.

⁸⁶ JD Alois, ‘Startup Funding Predicted to Take Coronavirus Induced Hit in Q1’ (*Crowdfund Insider*, 17 March 2020) <<https://www.crowdfundinsider.com/2020/03/158929-startup-funding-predicted-to-take-coronavirus-induced-hit-in-q1/>> accessed 8 February 2021.

⁸⁷ Sally Murrer, ‘Milton Keynes Hospital Staff Forced to Self-Isolate Due to Coronavirus Get Crowdfunding Help’ (*MkCitizen*, 16 March 2020) <<https://www.miltonkeynes.co.uk/health/coronavirus/milton-keynes-hospital-staff-forced-self-isolate-due-coronavirus-get-crowdfunding-help-2451923>> accessed 8 February 2021.

⁸⁸ Mark Taylor, ‘Crowdfunding Effort to Support Milton Country Park’ (*Cambridge Independent*, 14 April 2020) <<https://www.cambridgeindependent.co.uk/news/crowdfunding-effort-to-support-milton-country-park-9106269/>> accessed 8 February 2021.

⁸⁹ Cromwell Schubarth, ‘Yelp, Intuit Pitch in with GoFundMe to Help Small Businesses Hurt by COVID-19’ (2020) *Silicon Valley Business Journal* <<https://www.bizjournals.com/sanjose/news/2020/03/24/yelp-pitches-in-to-help-on-small-businesses-hurt.html>> accessed 8 February 2021.

The flood of activity in the crowdfunding space has also highlighted the vulnerabilities of such platforms and the cybercrime risks in the form of unscrupulous operators and scams.⁹⁰

E. Digital Currencies: Private and Sovereign

The decentralised nature of many cryptocurrencies has the potential to mitigate the danger of operational disruption due to a severe outbreak in a particular area. The advantages of a decentralised operational structure could come very much to the fore in this context.⁹¹ However, this has not stopped the price of Bitcoin, the most well-known cryptocurrency, from being highly volatile, belying its digital ‘safe haven’ reputation.⁹²

Certainly, one of the more controversial innovations where digital finance and the COVID-19 crisis overlap, was the development of the ‘CoronaCoin’⁹³ crypto-currency, announced in early February 2020. The idea behind the token was that the supply of the coin would diminish every two days at a rate connected with the fatalities caused by the virus. This would push up the price of the coin, rewarding investors with a return. The total supply of tokens was based on the global population and 20% of proceeds were to go to the Red Cross. What utility the coin provides or where it could be used remained unclear; and many (including Forbes magazine) labelled the cryptocurrency a macabre gimmick.⁹⁴ The coin has now lost all its value and had no noticeable impact.⁹⁵

⁹⁰ ‘FBI Warns of Potential Charity Fraud Associated with the COVID-19 Pandemic’ (*Federal Bureau of Investigation*, 14 October 2020) <<https://www.fbi.gov/news/pressrel/press-releases/fbi-warns-of-potential-charity-fraud-associated-with-the-covid-19-pandemic>> accessed 8 February 2021.

⁹¹ Hossein Nabilou, ‘Bitcoin Governance as Decentralised Financial Market Infrastructure’ (2021) *Stanford Journal of Blockchain Law & Policy* <<https://stanford-jblp.pubpub.org/pub/bitcoin-governance/release/2>> accessed 8 February 2021.

⁹² ‘Bitcoin’s Coronavirus Crash; Blockchain in a Pandemic’ (*Forbes*, 15 March 2020) <<https://www.forbes.com/sites/cryptoconfidential/2020/03/15/bitcoins-coronavirus-crash-blockchain-in-a-pandemic/#5862f9bf2a5b>> accessed 8 February 2021. But see also, Billy Bambrough, ‘Bitcoin’s Next Boom Has Already Begun’ (*Forbes*, 10 April 2020) <<https://www.forbes.com/sites/billybambrough/2020/04/10/bitcoins-next-boom-has-already-begun/#1d-dee1105c64>> accessed 8 February 2021.

⁹³ Anna Irrera, ‘CoronaCoin: Crypto Developers Seize on Coronavirus for New, Morbid Token’ (*Reuters*, 28 February 2020) <<https://www.reuters.com/article/us-china-health-crypto-currency/coronacoin-crypto-developers-seize-on-coronavirus-for-new-morbid-token-idUSKCN20M32A>> accessed 8 February 2021.

⁹⁴ Billy Bambrough, ‘Bitcoin and Crypto Investors: Avoid this New Cryptocurrency Like the Plague’ (*Forbes*, 10 March 2020) <<https://www.forbes.com/sites/billybambrough/2020/03/10/bitcoin-and-crypto-investors-avoid-this-new-cryptocurrency-like-the-plague/#68a360886cdb>> accessed 8 February 2021.

⁹⁵ ‘Token: CoronaCoin’ (*Etherscan*, 2020) <<https://etherscan.io/token/0xb80112E516DAbcaC6Ab-4665f1BD650996403156C>> accessed 8 February 2021.

As noted by the developers of CoronaCoin, however, the idea of a cryptocurrency with a virus or disease as an underlying asset-condition is not dissimilar to the World Bank's 2017 'Pandemic Bonds',⁹⁶ which were designed to help developing nations facing infectious disease outbreaks (but which are currently being offloaded by investors⁹⁷ and have never, even now, paid out).⁹⁸ A second round of offerings of the pandemic bonds instrument has now been abandoned by the World Bank in what is seen as a complete failure of the project to produce the material benefits expected.⁹⁹

The most significant impact of COVID-19 on digital currencies is likely to be on sovereign digital currencies, in particular central bank digital currencies ('CBDCs').¹⁰⁰ CBDCs and other forms of sovereign digital currency and electronic payment infrastructure are being developed very rapidly to provide foundational tools in connecting financial resources to individuals, businesses, NGOs, and government.¹⁰¹ Looking back, this may well be one of the central developments to emerge from the crisis. Looking forward, CBDCs – along with sovereign digital identity systems, interoperable electronic payments, universal communications and financial account access – may well be some of the major outgrowths of the pandemic and may prove to underpin financial systems able to support financial stability and underpin economies and societies in future existential sustainability crises of the sort we are unfortunately likely to see more of in coming years and decades.

F. Cross-Border Payments and Remittance Services

Remittances serve as an important lifeline for many economies around the world (e.g., Philippines, Bangladesh,¹⁰² Nepal). Despite some governments in remittance dependent economies initially denying the impact of COVID-19

⁹⁶ 'Fighting Disease with Finance: Pandemic Bonds, a New Idea' *The Economist* (27 July 2017).

⁹⁷ Anna Gross, 'World Bank's Pandemic Bonds Sink as Coronavirus Spreads' *Financial Times* (24 February 2020).

⁹⁸ Hanna Ziadi, 'These Bonds Were Supposed to Help Fight Diseases Like Coronavirus. They've Never Paid Out' (*CNN Business*, 15 February 2020) <<https://edition.cnn.com/2020/02/15/business/pandemic-bonds-coronavirus/index.html>> accessed 8 February 2021.

⁹⁹ 'World Bank Abandons Pandemic Bond Instrument After Disastrous Covid-19 Response' (*Bretton Woods Project*, 6 October 2020) <<https://www.brettonwoodsproject.org/2020/10/world-bank-abandons-pandemic-bond-instrument-after-disastrous-covid-19-response/>> accessed 8 February 2021.

¹⁰⁰ However, central bank digital currencies have already received increasingly positive attention from central banks and policymakers since late-2019 – see, Bank for International Settlements, 'Annual Economic Report' (30 June 2020) 87-9.

¹⁰¹ Douglas W Arner, Raphael Auer and Jon Frost, 'Stablecoins: Risks, Potential and Regulation' (2020) BIS Working Paper No 2020/905 <<https://www.bis.org/publ/work905.htm>> accessed 8 February 2021.

¹⁰² AKM Zamir Uddin, 'Remittance Was Cruising; COVID-19 Popped-up and Made it Swerve' (*The Daily Star*, 15 March 2020) <<https://www.thedailystar.net/business/news/remittance-was-cruising-then-covid-19-popped-and-made-it-swerve-1880968>> accessed 8 February 2021.

on inward remittances,¹⁰³ the figures are now clear and show a 7% decrease in global inward remittances by October 2020.¹⁰⁴ The World Bank predicts remittances to fall by about another 14% in 2021.¹⁰⁵ The effects of a global economic slowdown and widespread job losses has impacted low-skilled migrant workers in construction and hospitality industries in many regions where there has been a contraction in those sectors.

Remittances to Africa declined by 9% in 2020.¹⁰⁶ This is a massive hit, given that inward remittances to Africa are equivalent to 3% of the continent's GDP.¹⁰⁷

With many sectors scaling back or ceasing their activities due to government-imposed lockdown policies and in line with social distancing mandates, services are frequently limited to those designated as 'essential'. In most jurisdictions, that includes banks.¹⁰⁸ Non-bank exchange houses and remittance providers are not often in such a clear category. The role of online remittances and the use of mobile money, digital wallets, and other non-physical remittance digital infrastructure platforms has been crucial. Digital platforms, digital cash, and digital wallets have emerged as key tools and mechanisms towards

¹⁰³ Virgil Lopez, 'Government Sees Minimal Impact of COVID-19 on Remittances' (*GMA News*, 24 February 2020) <<https://www.gmanetwork.com/news/money/economy/727105/gov-t-sees-minimal-impact-on-remittances-due-to-covid-19/story/>> accessed 8 February 2021.

¹⁰⁴ The percentage has been rounded to 0 decimal places and was calculated based on data compiled by the World Bank showing that by October 2020, global inward remittance flows had decreased from US \$716,674 million in 2019 to US \$666,223 million. See, 'Annual Remittances Data: Inflows' (*World Bank*, October 2020) <<https://www.worldbank.org/en/topic/migrationremittancesdiasporaisues/brief/migration-remittances-data>> accessed 8 February 2021.

¹⁰⁵ 'COVID-19: Remittance Flows to Shrink 14% by 2021' (*World Bank*, 29 October 2020) <<https://www.worldbank.org/en/news/press-release/2020/10/29/covid-19-remittance-flows-to-shrink-14-by-2021>> accessed 8 February 2021. See also, 'Pandemic Hits Global Poor: World Bank Projects Drop in Remittances' (*NPR*, 6 February 2021) <<https://www.npr.org/transcripts/964893542>> accessed 8 February 2021.

¹⁰⁶ Teresa Welsh, 'Anticipated Remittance Dive Bucked by Latin America and the Caribbean' (*Devex*, 11 January 2021) <<https://www.devex.com/news/anticipated-remittance-dive-bucked-by-latin-america-and-the-caribbean-98880>> accessed 8 February 2021.

¹⁰⁷ Wafa Aidi, Razaq Fatai and Stephen Karingi, 'COVID-19 and Migrant Remittances: Supporting This Essential Lifeline Under Threat' (*Brookings*, 26 October 2020) <<https://www.brookings.edu/blog/africa-in-focus/2020/10/26/covid-19-and-migrant-remittances-supporting-this-essential-lifeline-under-threat/>> accessed 8 February 2021.

¹⁰⁸ For example, Australia: Ben Doherty, "'Non-essential' Services: What do Australia's Latest Coronavirus Restrictions Mean?" *The Guardian* (22 March 2020); Jason Walls, 'Covid-19 Coronavirus Lockdown: What is an "Essential" Service that Can Stay Open?' *The New Zealand Herald* (24 March 2020). Compared with Germany and Italy: Hans Seidenstuecker and Sinead Cruise, 'Some European Banks Shut Branches to Limit Coronavirus Spread' (*Reuters*, 17 March 2020) <<https://www.reuters.com/article/us-health-coronavirus-germany-banks/some-european-banks-shut-branches-to-limit-coronavirus-spread-idUSKBN-2132QX>> accessed 8 February 2021; 'Some Bank Branches Temporarily out of Service' (*Hong Kong Monetary Authority*, 31 January 2020) <<https://www.hkma.gov.hk/eng/news-and-media/press-releases/2020/01/20200131-3/>> accessed 8 February 2021.

ensuring that the financial symptoms of the pandemic are not harsher than they need to be for remittance-dependent countries, in addition to pretty much everyone else around the world, where there has been a clear trend away from use of cash and towards digital transfers, payments, and remittances, both public and private.

Importantly, digital finance offers the potential to underpin cheaper, more efficient, and safer cross-border payment systems, with related initiatives emanating from Facebook, with its proposed global stablecoin ‘Libra’/‘Diem’,¹⁰⁹ and a related and important initiative from the Group of 20 to enhance cross-border payments.¹¹⁰

G. Pensions and Retirement Funding

The initial impact of the virus on share markets around the world exposed many retirees and near-retirees to massive losses followed by massive gains and now the potential risks of asset price bubbles, particularly in technology-related stocks around the world. This has been exacerbated in most places by cuts in interest rates to stimulate the economy, but which also often reduces fixed income flows to dependent populations. In jurisdictions where there are compulsory retirement savings obligations (401K in the US and the Superannuation system in Australia, for example), of all financial impacts, share market fluctuations caused the big biggest immediate losses to individuals,¹¹¹ although in most cases those losses have now been recovered. In the US, lawmakers have attempted to address 401K related issues through Section 2202 of the CARES Act, which creates favourable tax treatment arrangements for types of asset distributions for those directly affected by the virus.¹¹²

Long considered the least innovative and disrupted part of the financial sector,¹¹³ the retirement planning or ‘WealthTech’ sector has been now forced into

¹⁰⁹ See, Dirk A Zetzsche, Ross P Buckley and Douglas W Arner, ‘Regulating Libra’ (2021) 41(1) Oxford Journal of Legal Studies 80-113 <<https://academic.oup.com/ojls/article/41/1/80/6031989?login=true>> accessed 8 February 2021.

¹¹⁰ Financial Stability Board, ‘Enhancing Cross-border Payments: Stage 3 Roadmap’ (13 October 2020) <<https://www.fsb.org/2020/10/enhancing-cross-border-payments-stage-3-roadmap/>> accessed 8 February 2021.

¹¹¹ Suzanne McGee, ‘Don’t Panic over your 401(k)! It’s Time to Emotionally Distance from the Markets’ *The Guardian* (23 March 2020); Madeleine Morris, ‘What Coronavirus Has Done to Your Superannuation Shares – And Why You Shouldn’t Panic’ *ABC News*, (19 March 2020) <<https://www.abc.net.au/news/2020-03-19/coronavirus-covid-19-what-has-it-done-to-superannuation-shares/12069628>> accessed 8 February 2021.

¹¹² ‘Coronavirus-Related Relief for Retirement Plans and IRAs Questions and Answers’ (*Internal Revenue Service*, 19 September 2020) <<https://www.irs.gov/newsroom/coronavirus-related-relief-for-retirement-plans-and-iras-questions-and-answers>> accessed 8 February 2021.

¹¹³ But see, on digitalisation through the development of digital finance platforms, Dirk Zetzsche, B Birdthistle, Douglas W Arner, and Ross P Buckley, ‘Digital Finance Platforms – Toward a New Regulatory Paradigm’ (2020) 23(1) University of Pennsylvania Journal of Business Law 11-70.

greater digitisation by the pandemic. COVID-19 has pushed many into early retirement and a rethinking of their life goals (and even life-expectations). This has encouraged greater digitisation to meet the growing demand for wealth planning and financial advice.¹¹⁴

Although most participants in these schemes are oblivious to what is happening to their savings, even if they wanted to actively participate in where or how their retirement nest eggs are invested, it would be far from straightforward. With managed funds, the best one could hope for would be a spectrum of investment options ranging from ‘cash’ (less risky) to ‘high return’ (riskier) investment configurations. The extent to which technology can assist individuals to manage their retirement savings is greater with self-managed funds. The ability to execute changes in investment options rapidly can be greatly enhanced through digital technology (including distributed ledger technology).

At present, the lag between change requests and execution (upto several days) is too slow to respond to the pace of economic changes and government announcements taking place. Some investors in this space are therefore moving towards the ‘robo-advising’ option in an effort to leverage technology to wrest back greater personal control of their assets.¹¹⁵ Robo-advisory services offer the potential to reduce costs through automation and scale while providing better quality services to many who could not justify the costs of high quality human advice. Going forward, WealthTech offers important savings, investment and pension opportunities to a much wider spectrum of the population than had previously been commercially viable – the true potential of digital finance to serve the ‘Next Billion’.

Ironically, the newest technologies in financial management may benefit the oldest members of our community the most.

¹¹⁴ Samuel Steinberger, ‘Coronavirus Fears Accelerate WealthTech Innovation’ (*Wealth Management*, 6 August 2020) <<https://www.wealthmanagement.com/technology/coronavirus-fears-accelerate-wealthtech-innovation>> accessed 8 February 2021; Antonina Olecka, ‘How is COVID-19 Impacting Global WealthTech? Perspective from the Swiss FinTech Ecosystem’ (*Swiss Finance + Technology Association*, 12 May 2020) <<https://swissfintech.ch/covid-19-impacting-global-wealthtech-perspective-swiss-fintech-ecosystem/>> accessed 8 February 2021.

¹¹⁵ Ross Snel, ‘Robo-advisor Account Sign-ups Surge Amid Pandemic’ (*Barron’s*, 1 April 2020) <<https://www.barrons.com/articles/robo-advisor-account-sign-ups-surge-amid-pandemic-51585757592>> accessed 8 February 2021. The price volatility and rapid changes in circumstances arising from the pandemic have created clear arbitrage opportunities that high frequency trading platforms have been able to exploit: John Detrixhe, ‘High-Frequency Traders are Winning Big Thanks to Coronavirus Disruption’ (*Quartz*, 5 April 2020) <<https://qz.com/1832540/high-frequency-traders-winning-big-amid-coronavirus-disruption/>> accessed 8 February 2021.

V. RISKS AND CHALLENGES OF DIGITISATION OF FINANCE: TECH-RISK

Digital finance brings both valuable and important tools and significant new forms of risk.¹¹⁶ COVID-19 has dramatically driven forward electronic payments and digital finance, and digitisation and digital activities more generally. This pervasive digitisation provides many benefits but at the same time, brings with it new dependency risks and potential for abuse. These opportunities and challenges are emerging as major policy questions that will require appropriate legal and regulatory responses from countries around the world.

A. Digital Financial Infrastructure: Cybersecurity Risks

In particular, there are increasing concerns about the robustness of fundamental digital infrastructure – the internet and communications systems – in addition to concerns about digital financial infrastructure. The more people work remotely, the greater the stress on the internet generally and on the security of Virtual Private Networks and other systems. Besides the obvious – insufficient bandwidth and reliability of server backbones – stresses can arise from issues such as shortages of spare parts for networks due to delays in shipping and border controls, and systems engineers being less available to install them due to illness or increased demand for their services. Further, increasing use of the internet could shift energy demand from industrial users to services and consumers – with a potentially detrimental effect on energy supply and infrastructure tailored for different user groups. The increasing ubiquity of digital finance also raises cyber risks in addition to digital infrastructure risks, whether of payments, securities, cloud, or the internet.¹¹⁷ Malicious actors have been quick to take advantage of the situation and governments have had to promptly distribute advice to citizens to make them aware of this growing threat.¹¹⁸ Moreover, digital proliferation brings increasing risks of crime, with the most rapidly growing area of crime being digital crime.¹¹⁹

Thus, cybersecurity and related legal and regulatory responses have emerged as a key challenge and area of focus in the years ahead: how to balance out the benefits and risks of our increasing digital dependency.

¹¹⁶ Buckley et al (n 28).

¹¹⁷ Buckley et al (n 28) 1.

¹¹⁸ 'Past Updates on COVID-19 Local Situation' (*Ministry of Health of Singapore*, 15 April 2020) <<https://www.moh.gov.sg/covid-19/past-updates>> accessed 8 February 2021.

¹¹⁹ Arner, Barberis and Buckley (n 23) 1292.

B. Concentration Risks

In addition to these, digitisation driven by COVID-19 has dramatically increased the role and significance of cloud, data and communications systems, infrastructure and firms. These industries are characterised by network effects and economies of scope and scale, which lead towards concentration or ‘winner-takes-all’ outcomes which were already evident prior to 2020. The dramatic increase in digitisation during 2020, however, has accelerated this process. It is now leading to a reaction – a necessary reaction – from governments around the world and particularly in major economies including the US, the EU, China, and India, that are focusing on the role of these firms and the risks of dominance vis-à-vis their advantages in terms of efficiency and in many cases, safety.

As a result, in addition to cybersecurity, the roles of data and data concentrations have emerged as key policy issues and major legal and regulatory challenges going forward. These will be among the biggest questions for societies around the world over the coming decade.

C. Data Risks

Finally, a major policy consideration will be how technologies (such as digital identification and tracking) can be misused by governments and state actors in addition to private companies. Along with control over the movement of people, we have good reason to fear interference with free speech and the right to express opinions – all in the name of health. Apparently justified by medical needs, we already see early examples where executive emergency powers are abused. We expect this trend to continue the longer the crisis continues and to the extent that it erodes the stability of a country’s institutions.¹²⁰ There is growing evidence of and concern about surveillance. These technologies were attracting substantial criticism before the crisis,¹²¹ but the crisis demonstrates how they can potentially save lives and this therefore supports their increasing deployment. Nonetheless, such technologies are likely to remain in place well after the crisis is over, and the need to regulate it adequately will remain a high priority.

In addition to cybersecurity and concentration risks, data use – both by the public and private sector – is emerging as a major area of policy attention,

¹²⁰ Ramya Vijaya et al, ‘Coronavirus Versus Democracy: 5 Countries Where Emergency Powers Risk Abuse’ (*The Conversation*, 7 April 2020) <<https://theconversation.com/coronavirus-versus-democracy-5-countries-where-emergency-powers-risk-abuse-135278>> accessed 8 February 2021.

¹²¹ Zak Doffman, ‘Why We Should Fear China’s Emerging High-Tech Surveillance State’ (*Forbes*, 28 October 2018) <<https://www.forbes.com/sites/zakdoffman/2018/10/28/why-we-should-fear-chinas-emerging-high-tech-surveillance-state/#7a64a0184c36>> accessed 8 February 2021.

with likely very different legal and regulatory approaches emerging across major economies.

These are all forms of Tech-Risk and they have been dramatically accelerated by COVID-19 digitisation, in particular, digitisation of financial, economic and social activity. Each of these areas is rapidly emerging as major policy, legal, and regulatory issues for countries across the world. Over the next decade, we expect these issues will be among the most important regarding digital finance as it is used to build better digital financial infrastructure to address future existential sustainability crises and to support wider sustainable development.

VI. CONCLUSION

The middle of a major crisis is not the time to try to implement entirely new digital and technological solutions. It is the time to use the digital infrastructure already in place to far greater, and potentially new, effects, and the best way to do this may well be for governments to continue working with the financial sector and fintech experts to explore what can be done in each country and across borders. Mobile money and other payment infrastructures are key to directing targeted payments to the people and small businesses most in need. These digital payment infrastructures offer speed and traceability. Trust and certainty need to be preserved and enhanced. Rapid support payments going to those most in need work best to achieve both ends.

Importantly, largely as a result of post-2008 regulatory reforms combined with the technological transformation of finance over the past decade, digital financial infrastructure around the world has proven robust in the context of the incredible strains placed upon it by the COVID-19 pandemic. This outcome is significant and should not be undervalued. It highlights the value of regulations geared to achieving financial stability, and more generally, the critical role of digital finance within that mandate. Digital finance has also played and is continuing to play an important role in supporting health and economic responses to this existential sustainability crisis. Nonetheless, the combination of central bank liquidity and digital finance is resulting in new volatility and possible asset price bubbles, which in turn bring new financial stability risks.¹²²

As quarantines and lockdowns have now become commonplace in most countries, billions of people around the world are being, or have been, restricted from leaving their homes. This is changing people's habits. This change can be measured by looking at the significant spike in e-commerce

¹²² See, Financial Stability Board, 'COVID-19 Pandemic: Financial Stability Implications and Policy Measures Taken' (Report to the G20, 15 April 2020) 1.

activity,¹²³ home entertainment use adoption,¹²⁴ (i.e., streaming services), and home delivery services.¹²⁵ Digital financial services and payment platforms are a key component of the online commercial sphere people have been forced to use.

The response to COVID-19 is essentially a large-scale social experiment. The shock is priming people's behaviour towards more online and digital options. Once the crisis resolves, it is very likely that the habits, cost savings, and convenience factors revealed to large swathes of consumers through this crisis will result in permanent behavioural changes.

There is a precedent. Following the 2008 crisis, financial institutions began to favour videoconference meetings over cross-border travel as part of cost cutting measures. Banks invested in the necessary hardware and people were incentivised to use these (at the time – new) tools. Ten years later, videoconferencing is the norm for many meetings around the world and is sustaining many sectors (such as education and shareholder meetings) in these unprecedented times.

Given that the digital infrastructure already exists, the COVID-19 outbreak will likely be the catalyst propelling an even faster adoption of activities relying on digital financial services. In the meantime, the intelligent, creative use of digital means offers much in the battle to alleviate the social, economic, and some health consequences of the crisis.

This digitisation however, is proving to be a potential two-edged sword: digitisation of finance and everything else brings new opportunities for financial, economic, and social interactions and business, with great potential to support not only financial stability but also wider sustainable development. At the same time, digitisation brings tremendous new risks and challenges – Tech-Risks – in particular relating to cybersecurity, data-concentration, and privacy. These risks are the subject of major policy debates around the world and present significant legal and regulatory challenges. What role will data and technology play in our financial systems, economies and societies? In addition, how can governments, through law and regulation, balance the tremendous positive

¹²³ Seb Joseph, 'As Coronavirus Outbreak Grinds on, E-commerce Operations Buckle under Increased Pressure' (*Digiday*, 24 February 2020) <<https://digiday.com/marketing/coronavirus-outbreak-grinds-e-commerce-operations-buckle-increased-pressure/>> accessed 8 February 2021.

¹²⁴ Todd Spangler, 'Coronavirus Spread Benefits Netflix, Other 'Stay-at-Home' Companies, Analysts Say' (*Variety*, 28 February 2020) <<https://variety.com/2020/digital/news/netflix-coronavirus-benefit-stay-at-home-stocks-1203518686/>> accessed 8 February 2021.

¹²⁵ Andrew Keshner, 'If the Coronavirus Spreads in America, Food Delivery Companies Could See a Surge in Demand – Are They Ready?' (*MarketWatch*, 2 March 2020) <<https://www.marketwatch.com/story/if-the-coronavirus-spreads-in-america-food-delivery-companies-could-see-a-surge-in-demand-are-they-ready-2020-02-28>> accessed 8 February 2021.

potential with the associated and emerging risks? These are the key policy fault lines emerging from COVID-19 digitisation we argue will characterise the challenges for societies globally during the 2020s.

Looking forward, it is clear that COVID-19 will not be the last pandemic or the last existential sustainability crisis. If anything, it is likely that the world will face an increasing range of existential sustainability crises going forward, not only from pandemics but in particular from climate change and geopolitics. The 2008 global financial crisis offered an opportunity to build a more stable and resilient financial system. The experiences of 2020 and COVID-19 suggest that these efforts were broadly successful. Similarly, the COVID-19 crisis offers an opportunity to focus on building more resilient and effective digital financial infrastructure that will not only prove robust in future existential sustainability crises but also provide key tools and systems to respond to such crises when they occur. At the same time, this digitisation brings with it important and fundamental questions for societies in terms of legal and regulatory approaches to digital finance in order to balance the positive with the potential for tremendous risk.