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**Central Bank Digital Currencies as a  
Potential Response to Some  
Particularly Pacific Problems**

**Anton N. Didenko and Ross P. Buckley**

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UNSW Law  
UNSW Sydney NSW 2052 Australia

E: [LAW-Research@unsw.edu.au](mailto:LAW-Research@unsw.edu.au)

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## CENTRAL BANK DIGITAL CURRENCIES

### AS A POTENTIAL RESPONSE TO SOME PARTICULARLY PACIFIC PROBLEMS

ANTON N. DIDENKO\* AND ROSS P. BUCKLEY†

*Despite years of effort, financial inclusion persists as a major challenge in the Pacific Island Countries (PICs), with many in the region still lacking access to financial services. This article argues that central bank digital currencies (CBDCs) offer a potentially highly efficacious solution to (i) the financial inclusion challenges of the PICs and (ii) the problem of high remittance costs that currently serve as a tax on the earnings of Pacific Islanders abroad. We identify the key challenges that may inhibit the rollout of CBDCs in PICs but argue that in time such a rollout is nonetheless highly likely – since the key drivers of CBDC development in the region are likely to be external to PICs themselves. While their potential is very significant, we conclude that now is not the time to issue a CBDC in the region, but it is the time to begin laying the groundwork for this innovation by developing the expertise required within the region’s central banks.*

**Keywords:** CBDC, Central Bank Digital Currency, Pacific Island Countries, financial inclusion

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\* Senior Lecturer, UNSW Sydney.

† Australian Research Council Laureate Fellow, KPMG Law - King & Wood Mallesons Chair of Disruptive Innovation, and Scientia Professor, UNSW Sydney.

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## I. INTRODUCTION

Central bank digital currencies (CBDCs) are widely considered the next stage in monetary evolution, having the potential to overcome long-standing challenges within the global currency and payments ecosystem.<sup>1</sup> Among the benefits of developing and issuing a CBDC, the following have been raised: (i) fostering financial inclusion of the unbanked and underbanked in our communities; (ii) ensuring that public money remains a dominant unit of account as private digital currencies emerge in increasing numbers; (iii) allowing the public to save and make payments in stable and credit risk-free money; and (iv) improving macroeconomic and financial stability.<sup>2</sup> On these bases, 86 per cent of central banks surveyed by the Bank for International Settlements are now reported to be actively engaging in research, experimentation or development of CBDCs.<sup>3</sup> Yet little rigorous evaluation of its viability and fitness for purpose in countries with relatively undeveloped digital and financial infrastructure has been undertaken. Addressing that gap, this article will examine the opportunities and risks associated with the implementation of CBDCs across small island states in the Pacific, focussing largely on their potential to improve financial inclusion in the region.

A CBDC is defined as ‘a digital payment instrument, denominated in the national unit of account, that is a direct liability of the central bank’.<sup>4</sup> While the definition appears

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<sup>1</sup> Carlos Viñuela, Juan Sapena and Gonzalo Wandosel, ‘The Future of Money and the Central Bank Digital Currency Dilemma’ (2021) 12(22) *Sustainability* 2.

<sup>2</sup> Ibid; Markus K. Brunnermeier, Harold James and Jean-Pierre Landau, ‘The Digitalization of Money’ (BIS, August 2019); John Barrdear and Michael Kumhof, ‘The Macroeconomics of Central-Bank-Issued Digital Currencies’ (BIS, February 2019); Michael D Bordo and Andrew T Levin, ‘Central Bank Digital Currency and the Future of Monetary Policy’ (Working Paper No 23711, National Bureau of Economic Research, August 2017).

<sup>3</sup> Codruta Boar and Andreas Wehrli, ‘Ready, Steady, Go? – Results of the Third BIS Survey on Central Bank Digital Currency’ (BIS paper No 114, January 2021) 6 <<https://www.bis.org/publ/bppdf/bispap114.pdf>>.

<sup>4</sup> Bank for International Settlements, *Central Bank Digital Currencies: Foundational Principles and Core Features* (Report No 1, 2020) 3 <<https://www.bis.org/publ/othp33.pdf>>.

straightforward, it has not been uniformly understood. As the variety of new forms of digital currencies keeps increasing, new designs sometimes envisage different forms of integration of official currency into privately issued payment instruments. This makes the analysis of the risks and opportunities underlying CBDCs problematic, as it can be difficult to distinguish a CBDC from certain privately issued digital currencies. In a recent report, the Bank for International Settlements (joined by the European Central Bank, the Board of Governors of the Federal Reserve System and central banks of Canada, England, Japan, Sweden, and Switzerland) stresses the importance of distinguishing a ‘true’ CBDC from a ‘synthetic’ one, arguing that a ‘synthetic CBDC’ is a misnomer that stands for a digital currency issued by a private party (eg a commercial bank) that is matched by deposits held at a central bank.<sup>5</sup> In this ‘synthetic’ structure, private parties essentially act as intermediaries between the central bank and the relevant end-users. As a result, the structure cannot be characterised as a CBDC, since end-users do not have a *direct claim* against the central bank (even if the balances held by the relevant private issuers are fully backed by central bank balances – essentially establishing a full reserve banking model).<sup>6</sup> A ‘synthetic’ structure also differs *conceptually* from a CBDC: while the former benefits from network effects created by profit-seeking private issuers, the latter is issued by a central bank acting in the interests of the public.<sup>7</sup> Furthermore, privately issued digital currencies backed by central bank deposits lack the flexibility of a CBDC: unlike central banks, which can relatively easily increase the size of their liabilities at short notice, private issuers need to ensure the relevant deposits are available at the central bank first (which cannot be guaranteed).<sup>8</sup> This article uses this narrow interpretation of the ‘CBDC’ concept, as it supports a focused and informed discussion based on straightforward terminology that is

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<sup>5</sup> Ibid 4.

<sup>6</sup> Ibid.

<sup>7</sup> Ibid.

<sup>8</sup> Ibid.

endorsed by the leading organisations investigating the implications of central bank digital currencies.

When considering the viability and potential impact of CBDCs for improving financial inclusion in the Pacific, the Bali Fintech Agenda serves as a useful starting point. It adopts a broad definition of financial inclusion, meaning ‘that individuals and businesses have access to useful and affordable financial products and services that meet their needs (transactions, payments, savings, credit, and insurance), and are delivered in a responsible and sustainable way’.<sup>9</sup> Fintech developments play an important role in achieving this progress,<sup>10</sup> although the Agenda acknowledges both the opportunities and risks of such technologies. On the one hand, the Agenda proclaims that the evolution of the financial system through fintech should be welcomed, as governments ‘are exploring fintech from the perspective of increasing financial inclusion for underserved populations and deepening financial markets, and of improving the efficiency of financial service provision’.<sup>11</sup> On the other hand, the Agenda acknowledges that ‘[r]eaping the full benefits of fintech requires adequate preparation’, including improvement of institutional capacity, locating relevant talent and expertise, broadening consumer education, and improving the stakeholder knowledge base.<sup>12</sup> As will be demonstrated further in this article, both of these angles will be crucial when assessing the prospects of CBDC implemented to advance financial inclusion.

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<sup>9</sup> Bali FinTech Agenda, ‘Attachment I. The Bali Fintech Agenda – Background Paper’ (2018) 12.

<sup>10</sup> See generally Sofie Blakstad and Robert Allen, *FinTech Revolution: Universal Inclusion in the New Financial Ecosystem* (Palgrave Macmillan, 2018). See also Ravikumar T, ‘Digital Financial Inclusion: A Payoff of Financial Technology and Digital Finance Uprising in India’ (2019) 8(11) *International Journal of Scientific & Technology Research* 3434, 3438 (arguing, in the Indian context, that ‘Fintech played a dominant role in achieving a mammoth 27% hike in access to the bank accounts by the adults in a span of three years’).

<sup>11</sup> *Ibid* 15.

<sup>12</sup> *Ibid*.

The remainder of this article is structured as follows. Section II briefly summarises some of the key financial inclusion challenges of the Pacific Island Countries. Section III examines the prospects of a CBDC for financial inclusion in the Pacific through the lens of possible opportunity costs for the local monetary and payment systems and outlines the main reasons for the likely proliferation of CBDCs in the region. Section IV outlines a number of important factors that affect the design of CBDCs in Pacific Island Countries. Sections V and VI explore the opportunities and challenges associated with the implementation of CBDCs for financial inclusion across the Pacific Islands. Section VII considers the key next steps for designing, and determining the viability of, CBDC rollout in the Pacific Island Countries in the future, and Section VIII concludes.

## II. FINANCIAL INCLUSION CHALLENGES OF PACIFIC ISLAND COUNTRIES

Pacific Island Countries ('PICs')<sup>13</sup> face many financial inclusion challenges, including (i) geographic remoteness, (ii) limited digital infrastructure and (iii) insufficient financial literacy.<sup>14</sup> In addition, the financial systems of the PICs tend to be dominated by a small number of banks,<sup>15</sup> which negatively affects competition.

### A. *Development of Digital Infrastructure in the Region*

The remote and disparate geography of the Pacific Island Countries results in highly varied access to basic infrastructure, including electricity and the internet. Limited access to such infrastructure restricts financial inclusion for a variety of reasons, such as lack of commercial

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<sup>13</sup> In this article, the term 'Pacific Island Countries' ('PICs') refers to the Cook Islands, Fiji, Kiribati, the Marshall Islands, the Federated States of Micronesia, Nauru, Niue, Palau, Papua New Guinea, Samoa, the Solomon Islands, Timor-Leste, Tonga, Tuvalu, and Vanuatu.

<sup>14</sup> Sonja Davidovic et al, *Strategy for Fintech Applications in the Pacific Island Countries* (IMF, 22 August 2019) 3 <<https://www.imf.org/-/media/Files/Publications/DP/2019/English/sfapicea.ashx>>.

<sup>15</sup> Ibid 4.

viability for suppliers of financial services, high usage costs for consumers and psychological barriers to saving and otherwise accessing financial infrastructure by the poor or technologically illiterate.<sup>16</sup> More than eight million people in the PICs have no electricity supply, and access to electricity is lowest in high-population countries (in particular, Papua New Guinea).<sup>17</sup> The level of internet penetration is largely similar to that of lower middle-income economies but remains low in absolute terms and very uneven.<sup>18</sup> The differences in levels of internet access range from 11.21% of the population in Papua New Guinea and 11.92% in the Solomon Islands to 49.97% in Fiji and 57% in Nauru,<sup>19</sup> while bandwidth is often limited or expensive or both.<sup>20</sup> The topography of the islands creates smaller customer bases, resulting in challenges for the even distribution of high-speed internet.<sup>21</sup> Broadband access in the PICs is also unequal. According to the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), out of 19 ESCAP members with 2% or lower fixed-broadband internet penetration in 2016 – eight were PICs.<sup>22</sup> At the same time, Fiji, Nauru and

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<sup>16</sup> See, eg, Anju Patwardham, ‘Financial Inclusion in the Digital Age’ in David Lee Luo Chuen and Robert H Deng (eds), *Handbook of Blockchain, Digital Finance, and Inclusion: Cryptocurrency, FinTech, InsurTech, and Regulation* (Academic Press, 2018) 84; Dan Radcliffe and Rodger Voorhies, *A Digital Pathway to Financial Inclusion* (December 2012) <[https://www.responsiblefinanceforum.org/wp-content/uploads/Pathway\\_Financial\\_Inclusion.pdf](https://www.responsiblefinanceforum.org/wp-content/uploads/Pathway_Financial_Inclusion.pdf)>.

<sup>17</sup> ADB, *Pacific Energy Update 2018* (Report, June 2018) 4 <<https://www.adb.org/sites/default/files/institutional-document/425871/pacific-energy-update-2018.pdf>>.

<sup>18</sup> Sonja Davidovic et al, *Strategy for Fintech Applications in the Pacific Island Countries* (IMF, 22 August 2019) 5 <<https://www.imf.org/-/media/Files/Publications/DP/2019/English/sfapicea.ashx>>.

<sup>19</sup> See Annex Table 12 ‘Telecommunication Infrastructure Index (TII) and Its Components’ in United Nations Department of Economic and Social Affairs, *E-Government Survey 2020* (Report, 2020) 288-293.

<sup>20</sup> Lauren Dickey et al, *Mapping the Information Environment in the Pacific Island Countries: Disruptors, Deficits, and Decisions* (Report, December 2019) 1 <[https://www.cna.org/CNA\\_files/centers/cna/cip/disinformation/IRM-2019-U-019755-Final.pdf](https://www.cna.org/CNA_files/centers/cna/cip/disinformation/IRM-2019-U-019755-Final.pdf)>.

<sup>21</sup> Nabilah Safira, *Toward Financial Inclusion In Pacific Islands* (Press Release, 4 November 2020) <<http://www.techinpacific.com/toward-financial-inclusion-pacific-islands/>>.

<sup>22</sup> UNESCAP, *Broadband Connectivity in Pacific Island Countries* (Working Paper, January 2018)

Tonga had mobile-broadband penetration of more than 30%.<sup>23</sup> Moreover, the broadband divide has continued to widen within the Pacific subregion in terms of cost: for example, it costs some PGK 230 (about USD 70) for a mobile prepaid 6 GB data monthly package in Papua New Guinea, while a similar package (6.5 GB) in Fiji costs only FJD 24.99 (about USD 12).<sup>24</sup>

Mobile phone subscription numbers are lagging behind other lower middle-income economies (at around 87% in 2018).<sup>25</sup> The disparity across the region is also substantial: mobile penetration numbers range from 21% in the Federated States of Micronesia and 28% in the Marshall Islands to 46% in Kiribati and 48% in Papua New Guinea to 110% in Timor-Leste, 118% in Fiji and 134% in Palau.<sup>26</sup> Despite the relatively high numbers, many PICs predominantly use older and lower-capacity 2G connectivity, instead of the more advanced 3G, 4G, or 5G networks.<sup>27</sup> Another challenge is catering for the different needs of the remote and more urban population, where ‘the urban communities crave the latest internet connectivity like 4G, yet the remote communities prefer a 2G connection via USSD-based platforms’.<sup>28</sup> These limitations restrict the types of technologies that can be efficiently implemented within the financial services sector in some areas.

Despite these challenges, some PICs have taken important steps towards improving the level of internet penetration – by building new submarine cable and satellite internet infrastructure.

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7 <[https://www.unescap.org/sites/default/files/PACIFIC\\_PAPER\\_Final\\_Publication\\_1\\_3.pdf](https://www.unescap.org/sites/default/files/PACIFIC_PAPER_Final_Publication_1_3.pdf)>.

<sup>23</sup> Ibid.

<sup>24</sup> Ibid.

<sup>25</sup> See ‘Mobile Cellular Subscriptions (Per 100 People)’, *The World Bank Data* (Web Page) <<https://data.worldbank.org/indicator/IT.CEL.SETS.P2>>.

<sup>26</sup> Ibid.

<sup>27</sup> Sonja Davidovic et al, *Strategy for Fintech Applications in the Pacific Island Countries* (IMF, 22 August 2019) 7 <<https://www.imf.org/-/media/Files/Publications/DP/2019/English/sfapicea.ashx>>.

<sup>28</sup> Nabilah Safira, ‘Toward Financial Inclusion In Pacific Islands’ (Press Release, 4 November 2020) <<http://www.techinapacific.com/toward-financial-inclusion-pacific-islands/>>.



For example, the installation of an international fiber-optic Coral Sea Cable – a 4,700 km long fibre optic submarine cable system linking Sydney to Port Moresby and Honiara) is expected to deliver a minimum of 20 Terabits per second data transfer capacity to each of Papua New Guinea and the Solomon Islands (40 Tbps in total for the two countries).<sup>29</sup> The Palau Submarine Cable Branch System Project – the first project under the Trilateral Partnership for Infrastructure Investment in the Indo-Pacific between Australia, Japan and the United States – seeks to provide redundancy for the first submarine cable installed in Palau in December 2017 (through the construction of a second fibre optic submarine cable system).<sup>30</sup> Satellite connectivity is facilitated by increasing the number of high-speed broadband commercial satellites like Kacific-1 that was successfully launched in geostationary orbit in December 2019.<sup>31</sup>

Despite major funding support offered by international development agencies like the Asian Development Bank and the World Bank, cable connectivity projects in PIC countries remain negatively impacted by political conflicts linked to competing interests of major economies operating in the region. A prime example is the East Micronesia Cable system designed to improve communications in Nauru, Kiribati and the Federated States of Micronesia: the project reached a stalemate following strong objections by the United States to the participation of a Chinese company in a World Bank-led bidding process.<sup>32</sup> Another challenge comes from the

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<sup>29</sup> ‘About the Project’, *Coral Sea Cable System* (Web Page) <<https://www.coralseacablesystem.com.au/about/>>.

<sup>30</sup> ‘Palau Submarine Cable Branch System Project (PC2)’, *Australian Infrastructure Financing Facility for the Pacific* (Web Page) <<https://www.aiiffp.gov.au/investments/investment-list/palau-submarine-cable-branch-system-project-pc2>>.

<sup>31</sup> ‘Kacific-1 Communications Satellite Successfully Launched by SpaceX’, *Spacewatch Asia Pacific* (Web Page) <<https://spacewatch.global/2019/12/kacific-1-communications-satellite-successfully-launched-by-spacex/>>.

<sup>32</sup> Jonathan Barrett and Yew Lun Tian, ‘Exclusive Pacific Undersea Cable Project Sinks after U.S. Warns against Chinese Bid’ (Reuters, 18 June 2012) <<https://www.reuters.com/world/asia-pacific/exclusive-pacific-undersea-cable-project-sinks-after-us-warns-against-chinese-2012-06-18/>>.

need to further develop internal cable networks *within* PICs to expand domestic access to high-bandwidth connections. Even recent initiatives like the Kumul submarine cable network – the first domestic undersea cable in Papua New Guinea primarily aiming to expand internal cable coverage – may fail to achieve stated objectives if landing stations ‘are located far away from major switching centres of ... telecom service providers’, as this may lead to high capital expenditure to build new optical fibre for interconnection purposes.<sup>33</sup>

### B. *Financial Inclusion in the Region*

The overall level of financial inclusion in PICs remains low (see Table 1). [*Table 1 follows on the next page*].

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<sup>33</sup> Joseph Kim Suwamaru, ‘Beneath the Veil of the Kumul Submarine Cable Network’ (2020) 2 *Electronic Journal of Informatics* 1, 21-22.

**Table 1. Financial inclusion statistics (selected Pacific Island Countries) based on publicly available data**

<b>Country</b>	<b>Adults who saved money at a formal institution</b>	<b>Formally banked adults</b>	<b>Adults with credit</b>	<b>Adults with insurance products</b>	<b>Remittances (sent or received)</b>
Fiji	39.3% <sup>36</sup>	79.5% <sup>37</sup>	12.6% <sup>38</sup>	41% <sup>39</sup>	23.3% <sup>40</sup>
Papua New Guinea	37% <sup>41</sup>	36.96% <sup>42</sup>	2.4% <sup>43</sup>	n/a	n/a

<sup>36</sup> National Financial Inclusion Taskforce and Reserve Bank of Fiji, *2020 Financial Inclusion Report* (Report, 2020) 31 <<https://www.rbf.gov.fj/wp-content/uploads/2021/03/FINANCIAL-INCLUSION-REPORT-2020.pdf>>.

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid 32.

<sup>40</sup> Reserve Bank of Fiji, *Financial Services Demand Side Survey Republic of Fiji* (Report, 2015) 35 <<http://www.pfip.org/wp-content/uploads/2016/08/Financial-Services.pdf>>.

<sup>41</sup> Centre for Excellence in Financial Inclusion, *(Second) National Financial Inclusion Strategy 2016-2020* 24 <<http://www.pfip.org/wp-content/uploads/2017/01/2-PNG-NATIONAL-FINANCIAL-INCLUSION-STRATEGY-2016-2020-final.pdf>>.

<sup>42</sup> Ibid 17.

<sup>43</sup> Ibid.

Samoa	11.1% <sup>44</sup>	39% <sup>45</sup>	13.4% <sup>46</sup>	20.6% <sup>47</sup>	58.3% <sup>48</sup>
Solomon Islands	17.08% <sup>49</sup>	27.26% <sup>50</sup>	3.87% <sup>51</sup>	7.08% <sup>52</sup>	35.94% <sup>53</sup>

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<sup>44</sup> PFIP, *Financial Services Demand Side Survey Samoa* (2016) 43 <<http://www.pfip.org/wp-content/uploads/2016/08/Samoa-DSS-REPORT-web-version.pdf>>.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

<sup>47</sup> Ibid.

<sup>48</sup> Ibid.

<sup>49</sup> PFIP, *Financial Services Demand Side Survey Solomon Islands* (2016) 22 <<http://www.pfip.org/wp-content/uploads/2016/08/Financial-Services-Demand-Side-Survey-Solomon-Islands.pdf>>

<sup>50</sup> Ibid.

<sup>51</sup> Ibid.

<sup>52</sup> Ibid.

<sup>53</sup> Ibid.

Timor-Leste	~16.42 (19% of bank account holders <sup>54</sup> and 69% of other account holders) <sup>55</sup>	67.6% <sup>56</sup>	14% <sup>57</sup>	N/A	~10.37% (17% of bank account holders) <sup>58</sup>
Tonga	18.2% <sup>59</sup>	48.0% <sup>60</sup>	13.6% <sup>61</sup>	13.4% <sup>62</sup>	73.2% <sup>63</sup>

<sup>54</sup> Banco Central de Timor-Leste, *Financial Inclusion Report 2020: Boosting Financial Services Access through Digitization* (2020) 46 <[https://www.bancocentral.tl/uploads/documentos/documento\\_1623908800\\_2157.pdf](https://www.bancocentral.tl/uploads/documentos/documento_1623908800_2157.pdf)>.

<sup>55</sup> Ibid 47.

<sup>56</sup> Ibid 42.

<sup>57</sup> Ibid 42.

<sup>58</sup> Ibid 46.

<sup>59</sup> PFIP, *Financial Services Demand Side Survey Tonga* (2016) 6 <<http://www.pfip.org/wp-content/uploads/2017/08/TONGA-DSS-REPORT-LOWRES-FINAL.pdf>>.

<sup>60</sup> Ibid.

<sup>61</sup> Ibid.

<sup>62</sup> Ibid 28.

<sup>63</sup> Ibid.

Vanuatu	26.8% <sup>64</sup>	36.7% <sup>65</sup>	9.2% <sup>66</sup>	5.4% <sup>67</sup>	48.6% <sup>68</sup>
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<sup>64</sup> PFIP, *Financial Services Demand Side Survey Vanuatu* (2016) 4 <<http://www.pfip.org/wp-content/uploads/2017/05/VANUATU-DSS.pdf>>

<sup>65</sup> Ibid 33.

<sup>66</sup> Ibid.

<sup>67</sup> Ibid.

<sup>68</sup> Ibid.

Cash remains the preferred payment method for most retail transactions, with paper cheques for larger transactions.<sup>69</sup> Heavy reliance on physical cash makes payments difficult, as it requires the payer to travel to the financial centre, which is typically costly and time-consuming in a region with highly dispersed population and a mountainous or multiple island geography.<sup>70</sup>

Several electronic money (e-money) services have been launched in the Pacific, seeking to replicate the rapid growth in regions like Sub-Saharan Africa or South Asia. The technology has grown quickly in Fiji (with nearly 1.2 million mobile money transactions reported in 2017 accounting for 0.8% of GDP), with rapid annual growth in the number of transactions exceeding 150 percent between 2014 and 2017.<sup>71</sup> Tonga and Samoa have demonstrated higher usage of e-money transactions, with the total value of transactions reaching 2.8% and 1.1% of GDP, respectively.<sup>72</sup> Formal payment systems in the region operate on a national – rather than regional – level (examples include FIJICLEAR, Fiji’s real-time gross settlement system, and Kina Automated Transfer System in Papua New Guinea that offers different types of settlement). At the same time, World Bank’s Pacific Payments, Remittances and Securities Settlement Initiative (PAPRI) aims to develop new integrated payment and settlement systems in Samoa, the Solomon Islands, Tonga, and Vanuatu.<sup>73</sup> Cross-border payments remain an important source of income in PICs (amounting to 10% of GDP on average) due to high emigration rates and seasonal employment.<sup>74</sup> The percentage is substantially higher in Tonga and Samoa, exceeding 30% and 15% of GDP, respectively.<sup>75</sup>

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<sup>69</sup> Sonja Davidovic et al, *Strategy for Fintech Applications in the Pacific Island Countries* (IMF, 22 August 2019) 17 <<https://www.imf.org/-/media/Files/Publications/DP/2019/English/sfapicea.ashx>>.

<sup>70</sup> Ibid.

<sup>71</sup> Ibid 19.

<sup>72</sup> Ibid.

<sup>73</sup> Ibid 20.

<sup>74</sup> Ibid.

<sup>75</sup> Ibid 20-21.

The substantial numbers of unregistered (i.e. not formally identified) people obstructs greater financial inclusion in the region. For example, it is estimated that 80% of the people of Papua New Guinea lack any clear form of identification.<sup>76</sup> In 2017, the Bank of Papua New Guinea supported a pilot ‘IDBox’ project – a digital identity management system utilising biometric data (fingerprints) and blockchain database structure.<sup>77</sup> The pilot usefully raised concerns about scalability and transaction capacity speeds,<sup>78</sup> and so the ADB supported Papua New Guinea to develop the digital access tool.<sup>79</sup> This tool – which gathers basic KYC data and captures photo ID before wirelessly transferring it to a plastic identification card using NFC technology – was successfully trialled as a proof-of-concept in 2019.<sup>80</sup> More recently, in 2020, the Government of Samoa contracted international consultants to provide technical assistance for establishing a country-wide identity management system – National Digital Identification System (NDIDS) – as part of a three-year implementation plan.<sup>81</sup>

The COVID-19 pandemic has led to a massive spike in cross-border remittances to PICs, with transfers to Fiji and Samoa increasing by as much as 400%.<sup>82</sup> However, despite the growing money

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<sup>76</sup> GSMA, *Digital Transformation: The Role of Mobile Technology in Papua New Guinea* (Report, 2019) <<https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/03/Digital-Transformation-The-Role-of-Mobile-Technology-in-Papua-New-Guinea.pdf>>.

<sup>77</sup> Ibid.

<sup>78</sup> Sonja Davidovic et al, *Strategy for Fintech Applications in the Pacific Island Countries* (IMF, 22 August 2019) 43 <<https://www.imf.org/-/media/Files/Publications/DP/2019/English/sfapicea.ashx>>.

<sup>79</sup> Lotte Schou-Zibell and Nigel Phair, ‘COVID-19 has Created Digital Opportunities in the Pacific’, *Asian Development Blog* (Blog Post, 6 July 2020) <<https://blogs.adb.org/blog/covid-19-has-created-digital-opportunities-pacific>>.

<sup>80</sup> Sonja Davidovic et al, *Strategy for Fintech Applications in the Pacific Island Countries* (IMF, 22 August 2019) 44 <<https://www.imf.org/-/media/Files/Publications/DP/2019/English/sfapicea.ashx>>.

<sup>81</sup> ‘National ID’, *Samoa Bureau of Statistics* (Web Page) <<https://www.sbs.gov.ws/nationalid>>.

<sup>82</sup> Nicolas Zoumboulis, ‘COVID-19 Leads to Huge Growth in Digital Money Transfers to Pacific but Concerns Remains [sic] over High Fees’ (Web Page) <<https://www.abc.net.au/radio-australia/programs/pacificbeat/covid-significant-growth-in-pacific-digital-remittances/12731412>>. Although the early months of the pandemic saw a slight decrease in remittances in the region, it has not been indicative of a sustained fall; see Stephen Howes and Sherman Surandiran, ‘Pacific Remittances: Holding up Despite COVID-19’, *Dev Policy Blog* (Web Page, 16 November 2020) <<https://devpolicy.org/pacific-remittances-covid-19-20201116/>>.



flows, the high fees charged by payment system operators and infrastructure providers (often with minimal or no competition) remain key obstacles for cross-border money transfers.<sup>83</sup> These obstacles stand in the way of achieving the targets of United Nations Sustainable Development Goal (SDG) 10, in particular elimination of ‘remittance corridors with costs higher than 5 per cent’ and reduction of transaction costs of migrant remittances to less than 3 per cent by 2030.<sup>84</sup>

### III. CBDCs IN THE PACIFIC ISLAND COUNTRIES: THE MAIN DRIVERS

The level of international regulatory interest in CBDCs is on the rise, as evidenced by the results of a recent survey by the Bank for International Settlements (BIS) published in January 2020:

‘Ever more central banks are currently (or will soon be) engaged in CBDC work. Some 80% of central banks ... are engaging in some sort of work ..., with half looking at both wholesale and general purpose CBDCs .... Some 40% of central banks have progressed from conceptual research to experiments, or proofs-of-concept; and another 10% have developed pilot projects ....’<sup>85</sup>

The trend continued throughout 2020, as 86% of central banks surveyed by the BIS were ‘exploring the benefits and drawbacks of CBDCs’.<sup>86</sup> While these numbers clearly evidence a shift towards greater overall engagement in CBDC projects globally, a closer look reveals that the types of such engagement can vary substantially across different countries. Indeed, the usefulness, feasibility and timeliness of a CBDC are likely to be perceived differently depending on the size

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<sup>83</sup> Ibid.

<sup>84</sup> *Transforming our World: The 2030 Agenda for Sustainable Development*, GA Res 70/1, UN Doc A/RES/70/1 (21 October 2015, adopted 25 September 2015) 21.

<sup>85</sup> Codruta Boar, Henry Holden and Amber Wadsworth, ‘Impending Arrival – A Sequel to the Survey on Central Bank Digital Currency’ (BIS paper No 107, January 2020) 3 <<https://www.bis.org/publ/bppdf/bispap107.pdf>>.

<sup>86</sup> Codruta Boar and Andreas Wehrli, ‘Ready, Steady, Go? – Results of the Third BIS Survey on Central Bank Digital Currency’ (BIS paper No 114, January 2021) 3 <<https://www.bis.org/publ/bppdf/bispap114.pdf>>.

of the relevant economy, level of development of digital infrastructure, financial inclusion challenges and various other factors.

Advanced economies generally have weaker motivations to launch CBDCs: they tend to be mostly concerned with payments safety and opportunities to improve the efficiency of cross-border payments.<sup>87</sup> Even for central banks actively involved in CBDC-related research, a CBDC can be seen as a solution searching for a problem to resolve. For example, after years of research and testing,<sup>88</sup> the Bank of Canada has ‘no plans to launch a CBDC’ and views a CBDCs largely as a contingency measure that could ‘become beneficial or even necessary’ if: (i) the use of banknotes declined beyond a certain threshold level limiting the ability of Canadians to use cash widely as a payment instrument, or (ii) Canada’s monetary sovereignty is threatened by the emergence of one or more alternative digital currencies replacing the Canadian dollar as the main form of money in the country.<sup>89</sup> In the meantime, the regulator is building the capacity to issue ‘a general purpose, cash-like CBDC should the need to implement one arise’.<sup>90</sup>

In contrast, emerging market economies (EMEs) demonstrate a much higher overall interest in CBDC projects because it is here that the need is greater. Unlike developed economies, the motivations of EMEs are more varied, ranging from improving domestic payments efficiency to financial inclusion. This greater level of interest is more likely to lead to actual CBDC implementation. In fact, according to the BIS, ‘[e]very central bank that has progressed to development or a pilot [CBDC] project is an EME institution’.<sup>91</sup> Overall, unlike developed

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<sup>87</sup> Ibid 4-5.

<sup>88</sup> See Bank of Canada, ‘Digital Currencies and Fintech: Projects’ (Web Page) <<https://www.bankofcanada.ca/research/digital-currencies-and-fintech/projects/#project-jasper>>.

<sup>89</sup> Bank of Canada, *Contingency Planning for a Central Bank Digital Currency* (Background Materials, 25 February 2020), online: Bank of Canada <<https://www.bankofcanada.ca/2020/02/contingency-planning-central-bank-digital-currency>>.

<sup>90</sup> Ibid.

<sup>91</sup> Codruta Boar, Henry Holden and Amber Wadsworth, ‘Impending Arrival – A Sequel to the Survey on

economies, EMEs appear to put greater emphasis on practical implementation of CBDCs aiming to resolve a broader variety of challenges, as evidenced by the launch of the digital version of the Bahamian dollar (known as the ‘Sand Dollar’) in October 2020<sup>92</sup> and the ongoing pilot of a digital version of the Eastern Caribbean dollar (DCash) developed by the Eastern Caribbean Central Bank.<sup>93</sup>

Finally, the central banks not actively considering CBDCs often come from smaller jurisdictions that tend to focus their efforts on other issues deemed more pressing.<sup>94</sup> Understandably, central banks in these countries are not persuaded they should be spending time and resources on CBDC projects and are likely to rely on research conducted by international organisations or regional networks.<sup>95</sup> It is easy to assume that a number of PICs would end up among this last group of countries, considering the pressing issues of financial inclusion discussed above. However, this is only a reasonable assumption if one treats the time and resources spent on developing, testing and launching a CBDC as an opportunity cost in the context of financial inclusion. This may be the case if a CBDC is introduced for purposes such as displacing foreign currency (eg the United States dollar) in domestic payments or modernising the wholesale (intrabank) settlement processes. But what if a CBDC is *built specifically for financial inclusion*? Would development of a CBDC be justified in that case, despite the limited resources? We cannot know definitively this answer without ex post empirical in-country data. But the current international dynamics described above

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Central Bank Digital Currency’ (BIS paper No 107, January 2020) 4  
<<https://www.bis.org/publ/bppdf/bispap107.pdf>>.

<sup>92</sup> ‘History’, *Sanddollar* (Web Page) <<https://www.sanddollar.bs/history>>.

<sup>93</sup> ‘About the Project’, *Eastern Caribbean Central Bank* (Web Page) <<https://www.eccb-centralbank.org/p/about-the-project>>.

<sup>94</sup> Codruta Boar, Henry Holden and Amber Wadsworth, ‘Impending Arrival – A Sequel to the Survey on Central Bank Digital Currency’ 3-4 (BIS paper No 107, January 2020)  
<<https://www.bis.org/publ/bppdf/bispap107.pdf>>.

<sup>95</sup> Ibid 4.

(which include not only the overwhelming majority of surveyed central banks actively investigating CBDCs, but also the increasing number of pilots and projects that have gone live or are expected to do so in the near future) suggest that development of CBDCs by PICs may well be only a matter of time – even if the anticipated benefits for financial inclusion are unclear. Our conclusion is based on two key considerations.

First, a domestic or regional CBDC is likely to be the most (or, in many cases, the only) effective response to the problem of ‘digital dollarisation’ – that is the risk that a CBDC issued by a foreign state (or group of states) may become so widespread that existing official currency will end up being effectively displaced in the domestic economy by such foreign CBDC. This risk has already been acknowledged as a ‘primary concern’ (particularly in ‘emerging market and developing economies’) around the international use of CBDCs.<sup>96</sup> Compared to cash dollarisation, ‘digital dollarisation’ can be particularly difficult to reverse or prevent for a number of factors, such as the absence of any need to replace old banknotes and coins.<sup>97</sup> As a result, introduction of a new domestic CBDC as an alternative makes sense in the long term as a *preventative* measure.

In PICs, the risks and potential impact of ‘digital dollarisation’ through foreign CBDCs are particularly high, due to the continuing withdrawal of correspondent banking relationships in the region, which has been among the largest in the world: between 2011 and 2019, ‘correspondent banking relationships fell 48 percent in Melanesia and 44 percent in Polynesia’.<sup>98</sup> Furthermore, while the rate of retreat of correspondent banking relationships ‘appears to have plateaued in many

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<sup>96</sup> Raphael Auer, Codruta Boar, Giulio Cornelli, Jon Frost, Henry Holden and Andreas Wehrli, ‘CBDCs beyond Borders: Results from a Survey of Central Banks’ (BIS paper No 116, June 2021) 7 <<https://www.bis.org/publ/bppdf/bispap116.pdf>>.

<sup>97</sup> Ibid.

<sup>98</sup> Reserve Bank of New Zealand, *Correspondent Banking in the Pacific* (Report, 1 July 2021) 2 <<https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Information-releases/2021/correspondent-banking-in-the-pacific.pdf?revision=ed56a3f5-d4eb-49eb-a278-f909b719b058>>.

parts of the world’, the rate of decline in the South Pacific has recently accelerated: ‘In 2019, the number of active cross-border correspondents fell by 11 percent in Melanesia and 9 percent in Polynesia, compared to a global decline of 3 percent.’<sup>99</sup> At the time of writing, data for 2020 are not available, but existing reports suggest this trend is likely to continue.<sup>100</sup> As a result, some PICs are facing the risk of complete exclusion from the global financial system. For example, in Tuvalu, the ‘NBT [National Bank of Tuvalu] – the only financial institution able to conduct international transactions—is currently exposed to the loss of its [correspondent banking relationships] with Australian banks’.<sup>101</sup> Such loss would have major implications for the national economy, from reducing the ability to receive donor grants, to limiting foreign exchange trading profits (which are the NBT’s largest source of income).<sup>102</sup> A loss of cross-border payment channels can be particularly damaging for PICs that rely on foreign remittance flows – such as Tonga, where remittance payments accounted for up to 40% of GDP in 2020.<sup>103</sup>

In these circumstances, securing reliable access to foreign banking systems becomes a strategic priority for many PICs. In this context, CBDCs could potentially offer PICs an opportunity to connect to overseas currency markets via multi-CBDC arrangements and corridors established by central banks, circumventing traditional correspondent banking that relies on commercial banks.<sup>104</sup>

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<sup>99</sup> Ibid.

<sup>100</sup> Ibid.

<sup>101</sup> International Monetary Fund, ‘Tuvalu: Staff Concluding Statement of the 2021 Article IV Mission’ (Mission Concluding Statement, 26 April 2021) <<https://www.imf.org/en/News/Articles/2021/04/26/mcs042621-tuvalu-staff-concluding-statement-of-the-2021-article-iv-mission>>.

<sup>102</sup> Ibid.

<sup>103</sup> Reserve Bank of New Zealand, *Correspondent Banking in the Pacific* (Report, 1 July 2021) 5-6 <<https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Information-releases/2021/correspondent-banking-in-the-pacific.pdf?revision=ed56a3f5-d4eb-49eb-a278-f909b719b058>>.

<sup>104</sup> For additional information on different design models of such arrangements see, eg, Raphael Auer, Philipp Haene and Henry Holden, *Multi-CBDC Arrangements and the Future of Cross-Border*

We anticipate that PICs will be more vulnerable to ‘digital dollarisation’ by CBDCs issued by those overseas economies with which such PICs have close economic ties – such as Australia and New Zealand (with traditionally strong links to PICs across the South Pacific) and the United States (which offers 11 PICs preferential access through the Compacts of Free Association and the Generalized System of Preferences).<sup>105</sup> However, things get a lot more complicated if multiple major economies concurrently develop CBDCs accessible in PICs. Furthermore, different stages of development of CBDC projects (with China seemingly in the lead with its e-CNY pilot)<sup>106</sup> suggest that even if other major economies respond with their own CBDCs, the rollout of such CBDCs is unlikely to be coordinated. Uncoordinated rollout of overseas CBDCs can shift the existing balance in PIC economies towards different overseas markets based on the technical features and access parameters of those CBDCs. Therefore, it is quite likely that end-users in some PICs may prefer to use the e-CNY developed by the People’s Bank of China (given the advanced stage of development of the project compared to other similar initiatives and the likelihood it will be subsidised and its use either very affordable or free).<sup>107</sup>

Second, the continuing expansion of cryptocurrency (including stablecoin) markets creates another pressure point for PIC economies – of the kind evidenced by the recent (and world-first) recognition of Bitcoin as legal tender by El Salvador.<sup>108</sup> We do not suggest, nor recommend, that Bitcoin will become recognised as legal tender in PICs in the same manner – yet even without such radical steps

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*Payments* (BIS Paper No 115, March 2021) <<https://www.bis.org/publ/bppdf/bispap115.pdf>>.

<sup>105</sup> ‘Pacific Islands’, Office of the United States Trade Representative (Web Page) <<https://ustr.gov/countries-regions/southeast-asia-pacific/pacific-islands-0>>.

<sup>106</sup> Working Group on E-CNY Research and Development of the People’s Bank of China, *Progress of Research & Development of E-CNY in China* (Report, July 2021) <<http://www.pbc.gov.cn/en/3688110/3688172/4157443/4293696/2021071614584691871.pdf>>.

<sup>107</sup> Ibid.

<sup>108</sup> Diario Oficial, San Salvador, Tomo No 431, 9 de Junio de 2021, Decreto No 57. A development, we would note, we see as deeply problematic for El Salvador. Bitcoin’s extreme price volatility renders it peculiarly ill-suited to serve as money.

different cryptocurrencies may create lucrative alternatives to domestic currencies as a store of value or method of payment (particularly as cryptocurrencies evolve to reduce known deficiencies, such as high energy consumption used in mining or uncertain reserve management arrangements to maintain the value of stablecoins). For some, proliferation of cryptocurrencies in domestic payment systems may create a semblance of digital financial inclusion – but this form of financial inclusion likely comes at a cost to consumers (in case of unexpected volatility of new currency types) and to the state (such as limitation of domestic monetary policy instruments), whereas the costs to individual end-users are inversely proportionate to the level of digital and financial literacy.

These two factors, coupled with our previous discussion about opportunity costs, create a conundrum. On the one hand, a CBDC that does not, by itself, generate clear, ex ante measurable benefits for PICs, should be viewed as an opportunity cost in the context of financial inclusion. On the other hand, the increasing risks of ‘digital dollarisation’ from overseas CBDCs and cryptocurrencies, as well as withdrawal of correspondent banking partners suggest that failure to develop and launch a domestic CBDC (pre-emptively or in response) may present an even greater opportunity cost, considering the potentially severe challenges of reversing ‘digital dollarisation’ or operating outside the global financial system.

We now turn to address the technical and policy implications of developing CBDCs by PICs.

#### IV. KEY DESIGN CHOICES AND PRINCIPLES

The different motivations discussed in the previous section determine the design choices of CBDCs. Consideration of the unique factors affecting PICs – including levels of digital infrastructure and population sizes – will play a crucial role in shaping any CBDC in the region.

##### 1. *Wholesale or Retail*

Some CBDC designs envisage that the circulation of CBDCs will be limited and end-users will only be financial institutions. These are referred to as ‘wholesale’ CBDCs. Other approaches design CBDCs to be broadly available to the general public for day-to-day use and are known as ‘retail’ or ‘general purpose’ CBDCs.

The former could be used for improving the efficiency of interbank payments or securities settlement (as seen in Projects Jasper (Canada), Ubin (Singapore) or Inthanon (Thailand)). However, the impact of these projects on financial inclusion is likely to be minimal. In contrast, we expect central banks interested in addressing financial inclusion challenges to consider issuing general purpose CBDCs.

General purpose CBDCs differ among themselves in terms of internal design and can be either token based, or account based.

## *2. Token Based or Account Based CBDCs*

The main difference between the two types of general purpose CBDCs lies in the verification process. In token based CBDCs, the object of verification is the digital token that represents each CBDC unit (similar to how, with cash, payments verification is limited to determining whether the relevant banknotes or coins are genuine and not counterfeit), whereas in account-based CBDCs verification of the identity of the account holder is required (and is usually done by an intermediary).<sup>109</sup>

In the PICs, we expect this design choice to be critically important as CBDCs are crafted to work in areas with different levels of digital infrastructure development. Account-based CBDC systems resemble typical bank account models, where control of the account is linked to the account-

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<sup>109</sup> See, eg, Tony Richards, Chris Thompson and Cameron Dark, ‘Retail Central Bank Digital Currency: Design Considerations, Rationales and Implications’ (Reserve Bank of Australia Bulletin, September 2020) 35-36 <<https://www.rba.gov.au/publications/bulletin/2020/sep/pdf/retail-central-bank-digital-currency-design-considerations-rationales-and-implications.pdf>>.



holder's identity.<sup>110</sup> Customer identification is central to the design of such CBDCs.<sup>111</sup> As a result, such CBDCs (i) are only feasible where strong identity verification systems are in place and (ii) typically require good internet connectivity and smartphone use.

In contrast, token-based CBDCs could be more efficient in areas with limited connectivity, as end-users can exchange tokens stored in digital wallets. In token-based CBDCs, a central bank will typically honour the claims of those users who can demonstrate knowledge of a certain value. Such value could be a secret key (essentially a digital signature used in public key cryptography),<sup>112</sup> where storage would be either custodial (managed by a trusted third-party entity or service), non-custodial (residing on a physical device owned by the end user) or some balance between the two options. These storage solutions may have a major impact on the benefits and risks associated with a token-based CBDC.

Non-custodial designs leave the control of the secret key in the hands of the end-user: on the one hand, they can provide truly universal access – as anyone would be able to obtain the relevant digital signature for the digital wallet (without the need for costly identification systems); on the other hand, unsophisticated consumers could lose access to their funds if they forget the private key or fail to keep it secret. In contrast, custodial designs rely on third party verification of end users' credentials – which improves accessibility and lowers the risk of misplacing the secret keys at the cost of requiring identity management functionality (thus reproducing the main challenges of account-based CBDCs).

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<sup>110</sup> Bank for International Settlements, 'BIS Quarterly Review: International Banking and Financial Market Developments' (March 2020) 93 <[https://www.bis.org/publ/qtrpdf/r\\_qt2003.pdf](https://www.bis.org/publ/qtrpdf/r_qt2003.pdf)>.

<sup>111</sup> Bank for International Settlements, 'BIS Annual Economic Report 2021' 82.

<sup>112</sup> Ibid 94.

Token-based systems are likely to create obstacles for tracing money flows and enforcement of anti-money laundering laws.<sup>113</sup> CBDC design will determine the level of anonymity afforded to end-users. Although some experts have argued that cash-like anonymity could be the key benefit of retail CBDCs,<sup>114</sup> the leading regulators in this area suggest that complete anonymity of CBDCs is unrealistic:

‘Full anonymity is not plausible. While anti-money laundering and combating the financing of terrorism (AML/CFT) requirements are not a core central bank objective and will not be the primary motivation to issue a CBDC, central banks are expected to design CBDCs that conform to these requirements (along with any other regulatory expectations or disclosure laws).’<sup>115</sup>

One of the key policy challenges in designing any CBDC will be to determine which entities have access to the transaction data generated by it:

‘Striking this balance between public privacy (especially as data protection legislation continues to evolve) and reducing illegal activity will require strong coordination with relevant domestic government agencies (eg tax authorities).’<sup>116</sup>

### 3. *DLT or Non-DLT Based*

Integration of distributed ledger technology (DLT) is a characteristic feature of existing CBDC projects. However, technically DLT is not necessary: CBDC platforms could utilise conventional centrally controlled databases. While both database structures can be used to store large amounts of data in different locations, the main difference lies in the process of updating stored records.

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<sup>113</sup> Ibid.

<sup>114</sup> Morten Bech and Rodney Garratt, ‘Central Bank Cryptocurrencies’ (2017) *BIS Quarterly Review* 67.

<sup>115</sup> Bank for International Settlements, *Central Bank Digital Currencies: Foundational Principles and Core Features* (Report No 1, 2020) 6 <<https://www.bis.org/publ/othp33.pdf>>.

<sup>116</sup> Ibid.

Centralised ledgers are the most common data storage device in finance today. Data can be stored in different physical nodes, but control is in the hands of a trusted administrator authorised to make changes to the database.

In distributed ledgers multiple data storage points (nodes) are connected with each other and store all data simultaneously, and together constitute the common ledger. DLT requires consensus of those nodes. The technical details of how to achieve consensus vary – multiple concepts have been developed, such as proof-of-work,<sup>117</sup> proof-of-stake,<sup>118</sup> proof-of-authority<sup>119</sup> and many others. While the distributed nature of a database may offer certain security benefits, the need for some kind of coordination between nodes reduces overall transaction processing speed compared to centralised systems. This often makes DLT poorly suited for large-scale general access CBDCs in major economies. However, in small economies (like PICs), these issues are likely to be less pronounced, given the much lower overall transaction volumes.

#### *A. Design Principles of CBDCs*

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<sup>117</sup> In a proof-of-work system, multiple servers ('nodes') all try to solve one (generally complex and resource-intensive) mathematical problem. The first node to solve the problem is compensated for the 'work' it has performed, while all others use the solution provided by the first node to verify that the problem has been correctly solved; thereby the solution to the mathematical problem assumes the function of a unique, one-time-use code.

<sup>118</sup> In a proof-of-stake system, the key function of adding new data to the ledger is facilitated by a group of network participants known as 'validators'. Validators lock up some of their digital asset holdings as a stake in the ecosystem. Following that, on a blockchain network, the validators facilitate the introduction of new blocks (eg by proposing new blocks or approving them) When the block gets added, the validators get a block reward in proportion to their stake. If the validators fail to perform their functions, they get penalised (and may lose up to the amount of their stake).

<sup>119</sup> A proof-of-authority (PoA) consensus algorithm leverages the value of identities. Like proof-of-stake algorithms, it relies on validators to add new data to the ledger. However, to become a validator on a proof-of-authority based ledger, a network participant is not required to stake any digital assets – PoA validators are identified and selected based on their reputation. Proof-of-authority can be considered a modification of a proof-of-stake consensus algorithm, whereby validators' reputation acts as a 'stake' (since the identify of all PoA validators is known, failure by a validator to perform its functions is likely to diminish its reputation).

In a recent report, published in October 2020, the BIS in collaboration with several leading central banks outlines some of a CBDC's core features and foundational principles (the 'BIS Report').<sup>120</sup> The report recognises the role of central banks in issuing cash for use by the public and highlights the accelerated use of digital payments, with the general decline in the use of cash being spurred on by the COVID-19 pandemic. As such, a primary driver for central banks in considering whether to issue a general purpose CBDC is how it can be used as an alternative form of money for payments, complemented by physical central bank cash. In formulating its foundational principles, the BIS Report follows a risk-based approach and highlights the need to identify all potential risks associated with issuing a CBDC, particularly those which threaten financial stability or may negatively impact financial market structures.

The BIS Report thus outlines three important foundational principles for central banks to consider in issuing a CBDC. First, a CBDC should not interfere with the public policy objectives or prevent banks from performing their monetary stability mandate (a 'do no harm' principle). Second, a CBDC should be used alongside and complement existing forms of money ('coexistence' principle). Third, a CBDC should promote innovation and competition to increase the overall efficiency and accessibility of the payment system (the 'innovation and efficiency' principle).<sup>121</sup>

Overall, the BIS Report highlights the continued work of the world's leading central banks in deciding whether to issue a CBDC. It is not meant to be definitive as to those decisions. The BIS' work will therefore continue, particularly in the next phase which involves additional policy analysis and CBDC design choice and technical experimentation.

It is unlikely that the rollout of CBDC projects will occur in a coordinated fashion or that different CBDCs will use the same technology. As a result, the need for cross-border interoperability of

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<sup>120</sup> Bank for International Settlements, *Central Bank Digital Currencies: Foundational Principles and Core Features* (Report No 1, 2020) <<https://www.bis.org/publ/othp33.pdf>>.

<sup>121</sup> Ibid 10.

different platforms is likely to arise as new CBDC platforms continue to emerge. Furthermore, many existing CBDC designs envisage public and private sector coordination, which creates pressure to ensure domestic interoperability across jurisdictions.

We expect interoperability to become a critical component of any CBDC design. The need for such interoperability has already been acknowledged by some of the leading central banks (including the Bank of Canada, the European Central Bank, the Bank of Japan, Sveriges Riksbank, the Swiss National Bank, the Bank of England and the Board of Governors of the Federal Reserve System):

‘The potential for cross-border interoperability should be considered by central banks from the outset of research on CBDC (focusing on broad harmonisation and compatibility between currencies to encourage safe and efficient transfers). The central banks in this group are therefore committed to coordinating as we move forward with our own domestic choices, exploring practical issues and challenges.’<sup>122</sup>

## V. CBDCs FOR FINANCIAL INCLUSION: THE OPPORTUNITIES

CBDCs may create considerable opportunities from the financial inclusion point of view. Depending on its design and legal characteristics, a CBDC may offer all, some, or none of the benefits discussed in this section.

First, CBDCs can help address the problem of insufficient reach of existing payment systems by implementing digital distribution channels and ICT infrastructure to provide access to central bank money to most of a population. In countries where the maintenance of a high volume of low-value payments and other financial services is deemed unsustainable or commercially unattractive for commercial banks or e-money operators, CBDCs can provide a government-authorised solution for storing value and making payments. This solution can help curb the risks associated with privately

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<sup>122</sup> Ibid 17.

issued cryptocurrencies (which can be particularly risky in the hands of non-expert end users). Furthermore, CBDCs can be a useful channel for governments to make economic stimulus payments to individuals and businesses, particularly in times of crisis. This is especially important for the PICs, which are particularly vulnerable to the effects of climate change and natural disasters: according to the *WorldRiskReport 2019*, many PICs are in the top 20 most at risk countries.<sup>123</sup> Vanuatu has the highest disaster risk worldwide, with Tonga, Solomon Islands and Papua New Guinea in the third, fourth and sixth places, respectively.<sup>124</sup> On top of that, Fiji and Timor-Leste were ranked 12<sup>th</sup> and 15<sup>th</sup> globally.<sup>125</sup>

Second, by issuing a CBDC, a state may pre-empt some of the customer verification problems associated with privately issued means of payment: if the private sector has not yet developed appropriate customer identification formats, a government can integrate secure customer verification tools into the CBDC from day one. This may help to achieve the objectives of anti-money laundering laws and is likely to induce the private sector to improve its consumer due diligence processes. UNCDF data supports this conclusion, recognising that ‘[a]n inclusive digital identity platform ... is a powerful tool to achieve large-scale inclusion.’<sup>126</sup> This is particularly relevant for PICs, where the lack of robust nation-wide digital ID platforms raises numerous frictions. In the Solomon Islands, such platforms are a high priority for the central bank ‘to enable financial inclusion and manage risks to the financial sector and beyond’ in the absence of a ‘single, accepted, universal ID’<sup>127</sup> and a substantial gap in foundational identity coverage (as 70% of the

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<sup>123</sup> *WorldRiskReport 2019* (2019) 7 <[https://reliefweb.int/sites/reliefweb.int/files/resources/WorldRiskReport-2019\\_Online\\_english.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/WorldRiskReport-2019_Online_english.pdf)>.

<sup>124</sup> Ibid.

<sup>125</sup> Ibid.

<sup>126</sup> ‘Inclusive Digital Identify Platforms: Country Diagnostics: Solomon Islands, Fiji & Vanuatu’, *UNCDF* (Web Page, 8 June 2021) <<https://www.uncdf.org/article/6814/inclusive-digital-identity-platform-country-diagnostics>>.s

<sup>127</sup> UNCDF, *An Inclusive Digital Identify Platform in the Solomon Islands* (Country Diagnostic, January 2021)

population lack a birth certificate).<sup>128</sup> In Fiji, where the foundational identity problem is less pronounced (as the birth registry covers 71% of the population), accounts are still opened ‘with hard-copy documents and in person only’, and thus a digital ID is considered an enabler of financial inclusion.<sup>129</sup> In addition, the common practice of obtaining multiple SIM cards to access mobile money services using different identity documents not only multiplies the risks of fraudulent activity, but also causes a leakage in the natural disaster assistance payment system.<sup>130</sup> Similar challenges are currently observed in Vanuatu, where duplication exists even at the level of foundational ID documents (as the number of people with a voter card exceeds the number of people with a birth certificate – which in theory should not be possible) and reforms are underway to eliminate this duplication.<sup>131</sup>

Third, a CBDC may promote digitisation of value chains in the economy, such as agriculture,<sup>132</sup> thereby promoting person-to-business and business-to-business payments.<sup>133</sup> More broadly, this may help to address the existing digital gap that is evident across PICs that leads to digital inequality and unequal access to the digital economy and prevents greater integration of physically dispersed PICs into the global economy.<sup>134</sup> In addition, it can foster interoperability within the financial

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<https://www.unctf.org/Download/AdminFileWithFilename?id=14498&cultureId=127&filename=2021-pacific-solomonislands-digital-id-country-diagnosticpdf>>.

<sup>128</sup> Ibid v.

<sup>129</sup> UNCDF, An Inclusive Digital Identify Platform in the Fiji (Country Diagnostic, January 2021) 21 <<https://www.unctf.org/Download/AdminFileWithFilename?id=14496&cultureId=127&filename=2021-pacific-fiji-digital-id-country-diagnosticpdf>>.

<sup>130</sup> Ibid.

<sup>131</sup> UNCDF, An Inclusive Digital Identify Platform in Vanuatu (Country Diagnostic, January 2021) 8, 19 <<https://www.unctf.org/Download/AdminFileWithFilename?id=14497&cultureId=127&filename=2021-pacific-vanuatu-digital-id-country-diagnosticpdf>>.

<sup>132</sup> A sector of PIC economy where the use of digital technologies ‘is still in its infancy’. See, eg, ‘FAO Regional Office for Asia and the Pacific’, Food and Agriculture Organization of the United Nations (Web Page) <<http://www.fao.org/asiapacific/perspectives/digital-villages/sids-dvi/en/>>.

<sup>133</sup> Cenfri, *The Use Cases of Central Bank Digital Currency for Financial Inclusion: A Case for Mobile Money* (June 2019) 4 <[https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion\\_A-case-for-mobile-money.pdf](https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion_A-case-for-mobile-money.pdf)>.

<sup>134</sup> International Labour Organization, *Digitalization and Decent Work: Implications for Pacific Island*

services sector by linking different payments systems through application programming interfaces (APIs),<sup>135</sup> similarly to how open banking frameworks around the world are linking financial institutions. Overall, CBDCs can help states build robust digital payment ecosystems.

Fourth, a CBDC has important advantages over other payment instruments used to promote financial inclusion, in particular e-money (also known as mobile money).<sup>136</sup> Although mobile money platforms are particularly popular in Sub-Saharan Africa (with almost 50% of the global share of registered mobile money customers and South Asia (with a share of almost 34%),<sup>137</sup> several projects have been recently launched in PICs. For example, in Fiji, the total volume of e-money in circulation in December 2019 increased to FJD 32.2 million, representing an almost 10 per cent increase from the previous year.<sup>138</sup> The number of registered accounts also increased by 11 per cent, to 345,323 accounts.<sup>139</sup> However, despite this, the share of clients who actively use their accounts remains low, with just 44 per cent of all registered users – translating into only 24.2 per cent of the adult population holding an active e-money account.<sup>140</sup> 2019 also saw a major 72.9 per cent drop in the total value of e-money payments in the country, from almost FJD 280 million in 2018 to FJD 75.8 million. This reduction was caused by the completion of government assistance programmes

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Countries (July 2019) 5-7 <[https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-suva/documents/publication/wcms\\_712544.pdf](https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-suva/documents/publication/wcms_712544.pdf)>.

<sup>135</sup> Nikhil Raghuvveera, ‘Central Bank Digital Currency Can Contribute to Financial Inclusion but Cannot Solve its Root Causes’ (Web Page) <<https://www.atlanticcouncil.org/blogs/geotech-cues/central-bank-digital-currency-can-contribute-to-financial-inclusion-but-cannot-solve-its-root-causes/>>.

<sup>136</sup> For a detailed analysis of the distinguishing features of e-money compared to other currency types, see Anton N Didenko and Ross P Buckley, ‘The Evolution of Currency: Cash to Cryptos to Sovereign Digital Currencies’ (2019) 42 *Fordham International Law Journal* 1041.

<sup>137</sup> Cenfri, *The Use Cases of Central Bank Digital Currency for Financial Inclusion: A Case for Mobile Money* (June 2019) 8 <[https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion\\_A-case-for-mobile-money.pdf](https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion_A-case-for-mobile-money.pdf)>.

<sup>138</sup> National Financial Inclusion Taskforce and Reserve Bank of Fiji, *2019 Financial Inclusion Report* (Report, 2019) 14 <[http://www.nfitfiji.com/wp-content/uploads/Fiji-Financial-Inclusion-Annual-report-2019\\_final.pdf](http://www.nfitfiji.com/wp-content/uploads/Fiji-Financial-Inclusion-Annual-report-2019_final.pdf)>.

<sup>139</sup> Ibid.

<sup>140</sup> Ibid.



disbursed through e-money platforms in the aftermath of Tropical Cyclones Jose and Keni.<sup>141</sup> However, as could be expected, the figures for 2020 tell a different story: remittances through e-money ‘recorded an unprecedented surge at \$82.1 million as at 31 December 2020’.<sup>142</sup>

Compared to e-money, CBDC issuers do not require an intermediary (such as a mobile operator) to issue CBDC units: by definition, a CBDC represents a direct liability of the relevant central bank. At the same time, a CBDC does not have to replace e-money and can be used solely for keeping the stored value safe. If the float is kept in a commercial bank account, insolvency of the relevant bank (in a country with deposit insurance) will typically allow the account holder to recover up to the maximum amount guaranteed by the deposit insurance scheme (if any) which will typically be relatively very small. However, the use of CBDC for this purpose will allow holders of stored value to guarantee the safety of the entire float even if the float amount exceeds the deposit insurance cap. Furthermore, the use of CBDCs in smaller countries with a low number of banks that can be used for storing the float can avoid the risks associated with insufficient market competition (and thus potentially higher costs charged by the holder of stored value) or potential exit from the relevant market by one or more of the existing commercial banks.

In addition, the state is able to generate additional demand for CBDCs through regulation (eg by giving the CBDC units the quality of legal tender) and by accepting CBDCs for payment of taxes and charges.

Fifth, of particular relevance to the Pacific, CBDCs have the potential to address some of the recurring challenges of cross-border payments. In 2020, the G20 made enhancing cross-border payments a strategic priority and issued three dedicated reports: (i) the stage 1 report by the FSB

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<sup>141</sup> Ibid.

<sup>142</sup> National Financial Inclusion Taskforce and Reserve Bank of Fiji, *2020 Financial Inclusion Report* (Report, 2020) 2 <<https://www.rbf.gov.fj/wp-content/uploads/2021/03/FINANCIAL-INCLUSION-REPORT-2020.pdf>>.

‘Enhancing Cross-Border Payments’ (April 2020),<sup>143</sup> (ii) the stage 2 report by the CPMI ‘Enhancing cross-border payments: building blocks of a global roadmap’ (July 2020)<sup>144</sup> and (iii) the stage 3 roadmap, which sets out a detailed agenda for the years 2020-2025.<sup>145</sup> The reform proposed by the G20 aims to facilitate cross-border payments while retaining the existing international payments infrastructure. Notably, however, one of the focus areas identified in the above reports focuses on ‘[e]xploring the potential role of *new payment infrastructures and arrangements*’.<sup>146</sup> Among other things, this focus area seeks to identify to what extent CBDCs may facilitate cross-border payments.<sup>147</sup>

In a cross-border context CBDCs can be implemented in different ways. On the one hand, they could be used to make payments to and from another currency area. On the other hand, different jurisdictions may facilitate interoperability of their domestic SDC platforms to simplify cross-currency payments.<sup>148</sup> The resulting benefits could be substantial and may include: (i) faster transaction processing on a 24/7 basis, (ii) improved transparency, or (iii) enhanced settlement mechanisms (eg ‘atomic’ settlement, which guarantees, in a bilateral settlement, that transfer of a currency in one direction occurs if and only if a corresponding transfer is made in the opposite direction) that could, among other things, facilitate intraregional trade.<sup>149</sup>

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<sup>143</sup> Financial Stability Board, *Enhancing Cross-border Payments: Stage 1 Report to the G20* (Report, 6 April 2020).

<sup>144</sup> Bank for International Settlements, *Enhancing Cross-Border Payments: Building Blocks of a Global Roadmap* (Report, July 2020).

<sup>145</sup> Financial Stability Board, *Enhancing Cross-border Payments: Stage 3 Roadmap* (Report, 13 October 2020).

<sup>146</sup> Ibid 5 (emphasis added).

<sup>147</sup> Committee on Payments and Market Infrastructures, *Enhancing Cross-border Payments: Building Blocks of a Global Roadmap* (Stage 2 Report to the G20 – Technical Background Report, July 2020) 9 <<https://www.bis.org/cpmi/publ/d194.pdf>>.

<sup>148</sup> See Bank for International Settlements, *Central Bank Digital Currencies: Foundational Principles and Core Features* (Report No 1, 2020) 7 <<https://www.bis.org/publ/othp33.pdf>>.

<sup>149</sup> See Marcos Allende Lopez et al, *A Caribbean Settlement Network: Can Blockchain Ease Intraregional Trade in the Caribbean?* (Report, 2020)

We acknowledge that some of the prospective benefits offered by CBDCs may indirectly impact financial inclusion, by equipping financial system regulators with additional tools to modernise the payment system generally. Below we outline only several examples of such indirect impact, as an exhaustive discussion of various opportunities of CBDCs is beyond the scope of this article.

For example, a CBDC can reduce cash management costs, which are particularly high in developing economies for a number of reasons, from expensive distribution and safekeeping security to reliance on bank branches.<sup>150</sup> It can lower the cost of maintaining the supply of physical currency and protecting it against counterfeiting. It can also create benefits for private payment system operators by reducing the bookkeeping, operational and payment reconciliation costs.<sup>151</sup> Merchants may benefit from reduced cash logistics, and individuals from minimised ATM withdrawal costs.<sup>152</sup>

On top of that, CBDCs can provide regulators with additional tools for exercising national (particularly monetary) policy. They can give central banks access to greater data about the economy and monetary flows, thus facilitating monitoring and supervision (especially in relation to key government expenditure in areas like public procurement). CBDCs can make possible certain monetary policy instruments, including negative interest rates (which are otherwise typically impracticable due to the risk of mass escape into cash). Overall, the control exercised by the state over CBDC interest rates is likely to improve the pass-through effects of monetary policy, making it harder for financial institutions not to adjust their own interest rates accordingly.

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<https://publications.iadb.org/publications/english/document/A-Caribbean-Settlement-Network-Can-Blockchain-Ease-Intra-regional-Trade-in-the-Caribbean.pdf>.

<sup>150</sup> Ibid.

<sup>151</sup> Cenfri, *The Use Cases of Central Bank Digital Currency for Financial Inclusion: A Case for Mobile Money* (June 2019) 6 <[https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion\\_A-case-for-mobile-money.pdf](https://cenfri.org/wp-content/uploads/2019/06/CBDC-and-financial-inclusion_A-case-for-mobile-money.pdf)>.

<sup>152</sup> Ibid.

At the same time, CBDCs can act a useful – and more secure and efficient – alternative to decentralised cryptocurrencies (like Bitcoin) that raise multiple challenges in terms of consumer and investor protection, combating money laundering and the financing of terrorism, enforcement of tax laws and international sanctions.

While these prospective innovations may hold significant potential, at the time of writing they remain entirely unproven or at very early stages of development, due to insufficient insight into the *underlying challenges* associated with innovative technologies.

## VI. CBDCs FOR FINANCIAL INCLUSION: THE CHALLENGES

Although the opportunities for financial inclusion generated by CBDCs can be substantial, the underlying challenges can also be significant. This is particularly so for PICs, which remain relatively undeveloped in the digital and financial infrastructure necessary to successfully implement the technology.

First, effective implementation of a CBDC is conditional on the availability of required infrastructure (in particular, electricity, internet and cellular network coverage, smart phone penetration and digital ID systems). Some countries may already have in place established physical payments infrastructure that could be adjusted to accommodate the CBDC integration. Others will need to develop it specifically for the CBDC.

Overall, we expect electricity and internet access to be the main enablers of CBDCs for financial inclusion. While some CBDCs can theoretically implement workarounds to operate in low-bandwidth areas (such as DCEP’s ‘touch and touch’ functionality allowing users to make peer-to-peer transfers by touching their mobile devices),<sup>153</sup> generally there is no simple solution for the

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<sup>153</sup> Karen Yeung, ‘What is China’s Sovereign Digital Currency?’, *South China Morning Post* (13 May 2020) <<https://www.scmp.com/economy/china-economy/article/3083952/what-chinas-cryptocurrency-sovereign-digital-currency-and-why>>.

problem of low internet penetration and any solution to this problem requires a token-based system (which brings its own challenges, such as obstacles for the enforcement of anti-money laundering laws and the need to promote adequate cybersecurity). Smartphone penetration is important for developing comprehensive and secure CBDC wallets due to the level of cryptography involved<sup>154</sup> and the need for greater accessibility of mobile wallets.

Second, as with any type of currency, the level of implementation of a CBDC will ultimately depend on the level of trust, demand and understanding among end users. In a recent study, only ‘54% of respondents stated they would trust a digital currency issued by their government or central bank’.<sup>155</sup> We anticipate this number to be substantially lower in PICs – considering that in some of these countries the overwhelming majority of population still prefers cash to digital forms of money. For example, the first-ever comprehensive financial services market survey carried out in Timor-Leste in 2020 revealed that 91% of respondents preferred cash to digital alternatives.<sup>156</sup> Furthermore, the main reason for rejection of electronic money was lack of understanding of the e-money concept.<sup>157</sup>

Lack of trust can be caused by a number of factors. First, insufficient technological and financial literacy (a major challenge in PIC countries)<sup>158</sup> may lead to a confusion between a CBDC, a

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<sup>154</sup> Nikhil Raghuvvera, ‘Central Bank Digital Currency Can Contribute to Financial Inclusion but Cannot Solve its Root Causes’ (Web Page) <<https://www.atlanticcouncil.org/blogs/geotech-cues/central-bank-digital-currency-can-contribute-to-financial-inclusion-but-cannot-solve-its-root-causes/>>.

<sup>155</sup> Samuel Haig, ‘Survey: Consumers Trust CBDCs Over Privately-Issued Crypto Assets’ (20 April 2020) <<https://coingeography.com/news/survey-consumers-trust-cbdc-over-privately-issued-crypto-assets>>. (The survey was conducted in a range of countries, including the developed: Australia, France, South Korea, Singapore, US and UK; and the emerging: Brazil, the Philippines, South Africa, Turkey and Vietnam).

<sup>156</sup> Banco Central de Timor-Leste, *Financial Inclusion Report 2020: Boosting Financial Services Access through Digitization* (2020) 63 <[https://www.bancocentral.tl/uploads/documentos/documento\\_1623908800\\_2157.pdf](https://www.bancocentral.tl/uploads/documentos/documento_1623908800_2157.pdf)>.

<sup>157</sup> Ibid.

<sup>158</sup> Asian Development Bank, *Digital Financial Services in the Pacific: Experiences and Regulatory Issues* (2016) 18-19 <<https://www.adb.org/sites/default/files/publication/182300/digital-financial-services-pacific.pdf>>.

privately issued decentralised cryptocurrency (like Bitcoin), a centralised stablecoin pegged to an official currency (like Tether or Diem) and a ‘synthetic’ CBDC discussed above. The lack of a widely accepted terminology for digital currencies further exacerbates the issue. Furthermore, the issuer’s reputation may discourage the adoption of a new type of currency: as has been demonstrated by the example of Ecuador, a sovereign issuer or sovereign backing is not of itself enough to guarantee success, especially where a government has defaulted on sovereign bonds in the past.<sup>159</sup> Consequently, in PICs the roll-out of CBDCs will likely require additional consumer-focused programs focusing on (i) financial literacy and awareness raising,<sup>160</sup> (ii) collection of feedback and complaints from end users and (iii) consumer protection standards.<sup>161</sup>

Ultimately, unless the state bans all alternative forms of official currency and forces the transition to a CBDC (which would be highly unusual), market forces will determine CBDC usage. Although sovereigns have a broader arsenal of tools at their disposal (such as the prerogative to designate a

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<sup>159</sup> See Lawrence White, ‘The World’s First Central Bank Electronic Money Has Come – And Gone: Ecuador, 2014-2018’, available at <https://www.cato.org/blog/worlds-first-central-bank-electronic-money-has-come-gone-ecuador-2014-2018>.

<sup>160</sup> Strong evidence suggests poor financial literacy leads to low utilisation of financial services and products, even when available in PICs. In Papua New Guinea, for example, 49 per cent of low-income customers interviewed in one recent study said they were not using their MiBank mobile savings account (a pilot project developed in collaboration with the Pacific Financial Inclusion Programme) because they had forgotten their four-digit PIN required to access their account. Financial literacy programs can assist by having agents help customers reset their pins and educating them on the importance of this security feature. Such programs have proven effective in similar contexts. For example, in Kenya, Safaricom’s mobile money platform has proven extremely successful due to its agent network. Agents perform three important roles: they register customers, educate them about mobile money and facilitate cash-in/cash-out transactions. These initiatives can improve financial and digital literacy whilst also playing a pivotal role in building trust in financial services. See Eric Sena Morttey and Naomi de Groot, ‘Third Time Lucky: How PIN Codes are Inhibiting the Uptake of Mobile Financial Services in Papua New Guinea’ (Blog Post, UNCDF, 20 August 2020) <<https://www.uncdf.org/article/6010/third-time-lucky-how-pin-codes-are-inhibiting-the-uptake-of-mobile-financial-services-in-papua-new-guinea>>; Neil Davidson and Paul Leishman, ‘Building a Network of Mobile Money Agents’ (Report, GSMA, 2012) <<https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2012/03/building.pdf>>.

<sup>161</sup> Nikhil Raghuvveera, ‘Central Bank Digital Currency Can Contribute to Financial Inclusion but Cannot Solve its Root Causes’ (Web Page) <<https://www.atlanticcouncil.org/blogs/geotech-cues/central-bank-digital-currency-can-contribute-to-financial-inclusion-but-cannot-solve-its-root-causes/>>.

CBDC as the official currency equivalent to cash and funds in bank accounts), the need to generate sufficient trust in, and demand for, a CBDC remains. In some economies, the resilience of the underlying technology (like DLT), the composition of the governing entity, and the legal status and reputation of the central bank responsible for the CBDC will often be sufficient. However, where a state or central bank has failed to meet its obligations in the past, state backing may mean little; and when inadequate, additional supporting mechanisms may be needed (such as the price stabilisation of Venezuela's Petro – which nonetheless failed).

Third, regulatory expertise will be crucial to liberate the benefits and curb the risks of CBDCs. In our experience, even central banks in major economies may struggle with the technological implications of CBDCs. We expect that the development of CBDC platforms in PICs will be outsourced to third party developers – in which case regulators must nonetheless have the capacity to understand the CBDC programming code and ensure CBDC platforms do not function as 'black boxes'. The offering of a CBDC, in addition to current monetary and payment arrangements, is a fundamental change to the financial architecture of any country, and thus must be understood in depth by its central bank.

Fourth, rollout of CBDCs with general access creates new cybersecurity risks for all stakeholders involved in CBDC operation, including the regulators and even financially literate users. While in recent years several major economies have enhanced their cybersecurity frameworks,<sup>162</sup> the corresponding legal frameworks in PICs are likely to be insufficiently advanced to match the magnitude of risks associated with the CBDCs. After all, CBDC platforms can only be as secure as (i) the underlying technology and design allows, (ii) the regulator has capacity to efficiently oversee CBDC operations, gather cybersecurity intelligence, pre-empt risks, and coordinate recovery efforts

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<sup>162</sup> See Anton N Didenko, 'Cybersecurity Regulation in the Financial Sector: Prospects of Legal Harmonization in the European Union and Beyond' (2020) 25(1) *Uniform Law Review* 125.

in case of a cyber incident, and (iii) end-users' understanding of how to use the relevant technology and minimise its risks. In this context, existing (and rather limited) data on cybersecurity in PIC countries offers very limited insights. On the one hand, back in 2017 AUSTRAC<sup>163</sup> assessed the risk of criminality associated with remittances sent from Australia to PICs as low.<sup>164</sup> On the other hand, this analysis had a limited scope (covering only remittances sent from Australian remittance providers and largely informed by suspicious matter reports submitted to AUSTRAC over a one-year period) and is hardly relevant in the context of CBDCs that might be implemented in PICs for financial inclusion: after all, such CBDCs would be launched and overseen by PIC regulators with much more limited resources (when compared to their Australian counterparts) and would almost certainly be used nation-wide (as otherwise the financial inclusion objectives are unlikely to be realised). In addition, in recent years, the cybersecurity threat landscape has evolved: for five years in a row the financial sector has been the most attacked industry globally (accounting for 23% of all cyber-attacks in 2020).<sup>165</sup>

Fifth, every CBDC project raises a broad range of competition issues. Depending on the type and size of the economy, by issuing a CBDC a central bank may engage in competition with commercial banks, central counterparties, other payment system operators and even other central banks, and the CBDC may engage in direct competition with other types of currency in circulation. In PICs with generally lower levels of financial inclusion and less diversified payment systems, CBDCs are most likely to impact commercial banks and e-money operators. At the same time, the impact on competition will ultimately depend on the CBDC design. On the one hand, DLT may be used to disintermediate access to the new currency, sidelining incumbent payment system operators. On the

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<sup>163</sup> Australian Transaction Reports and Analysis Centre.

<sup>164</sup> AUSTRAC, *Remittance Corridors: Australia to Pacific Island Countries: Money Laundering and Terrorism Financing Risk Assessment* (2017) 14 <<https://www.austrac.gov.au/sites/default/files/2019-06/remittance-corridors-risk-assessment.pdf>>.

<sup>165</sup> IBM, 'X-Force Threat Intelligence Index 2021' (2021) 37.



other hand, CBDCs may be used in tandem with other payments instruments in a synergistic manner (for example if CBDCs are integrated into e-money platforms and used to maintain the safety of the float).

Sixth, outsourcing the development of CBDC platforms raises a wide range of issues. If costs of development are not paid upfront (by or on behalf of the relevant state or development agency), cost-recovery mechanisms are likely to be put in place – and need to be both reasonable and safe from the point of view of overall monetary sovereignty of the implementing country. As an example, the Republic of Marshall Islands passed legislation in 2018 which provided the legal basis for an upcoming initial coin offering of up to 6,000,000 ‘Sovereign’ (‘SOV’)<sup>166</sup> units issued on a DLT platform by the Ministry of Finance (out of the total issue of 24,000,000 units).<sup>167</sup> The development and issuance of SOV is outsourced to a third-party developer (‘Appointed Organizer’, which bears all relevant upfront costs: ‘The costs necessary to issue the SOV and perform the ICO shall be borne by the Appointed Organizer. The RMI shall not be required to contribute any of the costs necessary to issue the SOV and perform the ICO.’<sup>168</sup> Cost recovery is on an *ex post* basis: the Appointed Organizer receives 50% of the overall issuance amount (12 out of 24 million SOV units).<sup>169</sup> This cost recovery model exploits the sovereign egregiously and is not one we would ever endorse.

Instead, outsourcing arrangements will need to provide for sufficient protections in case of inadequate coding or programming, such as allocation of liability and insurance. In our experience of private banking practice, software development contracts often substantially limit the developer’s liability. In academic literature, this phenomenon has been referred to as an unusual ‘legal cocoon’

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<sup>166</sup> *Declaration and Issuance of the Sovereign Currency Act 2018* s303(a) [https://rmiparliament.org/cms/images/LEGISLATION/PRINCIPAL/2018/2018-0053/DeclarationandIssuanceoftheSovereignCurrencyAct2018\\_1.pdf](https://rmiparliament.org/cms/images/LEGISLATION/PRINCIPAL/2018/2018-0053/DeclarationandIssuanceoftheSovereignCurrencyAct2018_1.pdf).

<sup>167</sup> *Ibid* s 305(3).

<sup>168</sup> *Ibid* s 305(1).

<sup>169</sup> *Ibid* s 309.

of software developers: according to one study based on examination of hundreds of software licence agreements, the problem is not limited to software developed for consumers and remains prevalent even in contracts with sophisticated commercial parties.<sup>170</sup> Software can be offered on ‘as is’ basis (effectively eliminating liability), may come with excluded warranties and with express acknowledgement that it may not be error-free; finally, even where some developer liability remains, it is likely to be capped (eg, to the amount of fees paid for the development of the software). At the same time, the potential reputational risks of central banks implementing a poorly functioning CBDC can be unlimited. As a result, it is critical that central banks that wish to experiment with CBDCs plan accordingly and develop appropriate protections, contractual and otherwise.

Seventh, while the scope of this article is limited to digital currencies issued by *central banks*, the obvious challenge for some PICs is the lack of a central bank that could act as an administering authority for a CBDC. At the time of writing, only Fiji, Papua New Guinea, Samoa, the Solomon Islands, Timor-Leste, Tonga and Vanuatu have an independent central bank.

## VII. NEXT STEPS

In this section, we list some of the key steps that must be taken into account when determining the viability of CBDC rollout in PICs.

First, CBDC designs should take into account the results of existing research performed by overseas central banks and international organisations. In particular, we emphasise the three design principles listed in the recent report prepared by the Bank for International Settlements jointly with a group of leading central banks:

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<sup>170</sup> Marian K. Riedy and Bartłomiej Hanus, ‘It Is Just Unfair Using Trade Laws to “Out” Security Software Vulnerabilities’ (2017) 48 *Loyola University Chicago Law Journal* 1099.

‘The principles emphasise that: (i) a central bank should not compromise monetary or financial stability by issuing a CBDC; (ii) a CBDC would need to coexist with and complement existing forms of money; and (iii) a CBDC should promote innovation and efficiency.’<sup>171</sup>

Second, not all CBDC designs are meant to address financial inclusion challenges. We expect that CBDCs with *general access* will have the greatest effect on financial inclusion and will be particularly relevant for the PICs.

Third, CBDCs in the Pacific should make the best use of (i) opportunities for regional collaboration and (ii) existing arrangements in the sector, such as the *Samoa Commitment for the Pacific Islands*, which confirmed the intention of central bank governors to ‘deepen and enhance the efficiency of [the] financial systems, so as to best support economic development and inclusion in [the] region’ and agreement to ‘lead the development of a regional ‘know your customer’ facility and associated regionally-linked payment and settlement arrangements’.<sup>172</sup> In addition, the Alliance for Financial Inclusion has also started exploring the opportunities offered by CBDCs.<sup>173</sup>

Fourth, in light of the relatively low number of competing payment system providers in the region, PIC central banks need to seriously consider the potential negative implications of CBDCs for competition in the sector. Specifically, they should assess to what extent CBDCs can be integrated into existing privately issued products and services – and how such integration could be best achieved.

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<sup>171</sup> Bank for International Settlements, *Central Bank Digital Currencies: Foundational Principles and Core Features* (Report No 1, 2020) 7 <<https://www.bis.org/publ/othp33.pdf>> 1.

<sup>172</sup> Reserve Bank of Australia, ‘Samoa Commitment for the Pacific Islands’ (Media Release, 29 November 2018) <<https://www.rba.gov.au/media-releases/2018/mr-18-30.html>>.

<sup>173</sup> AFI, ‘AFI Members Explore Central Bank Digital Currency Opportunities’ (Web Page) <<https://www.afi-global.org/news/2020/11/afi-members-explore-central-bank-digital-currency-opportunities>>.

Fifth, rollout of a CBDC by PICs should be assisted by a range of activities aimed at promoting customer understanding of the new technology, to generate demand and promote trust in the issuing central bank – and equally importantly to prevent misuse and abuse of less financially literate and technology savvy people.

Some of these themes are highlighted in the experience of the Bahamas. The Central Bank of The Bahamas announced that it would commence its gradual release of the digital version of the Bahamian dollar (known as the ‘Sand Dollar’) from 20 October 2020.<sup>174</sup> Adopting a staged release process, the first phase covers the end of 2020 and the first quarter of 2021 and focuses on making the sand dollar available across the private sector, among three tiers of authorised accounts: (i) low-value personal wallets with lower transaction limits, (ii) regular personal accounts and (iii) business or enterprise accounts. Each tier comes with different know-your-customer requirements. The second phase (first and second quarters of 2021) targets Government services and public utilities.<sup>175</sup> The rollout of sand dollars is facilitated by authorised financial institutions: several money transmission businesses, payments service providers and one commercial bank have been permitted to offer sand dollar services to end users. Sand dollar wallets are protected by multi-factor authentication (all mobile devices must support a device passcode or biometrics).<sup>176</sup> Importantly, the strategy of the central bank of The Bahamas includes ‘sustained financial literacy campaigns to boost product awareness and encourage more positive behaviour around personal finances’, as well as ‘education around cyber safe financial behaviour’.<sup>177</sup> This multi-faceted approach for releasing a CBDC – which seeks to increase the accessibility of financial services whilst recognising the

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<sup>174</sup> Central Bank of the Bahamas, ‘The Sand Dollar is on Schedule for Gradual National Release to The Bahamas in mid-October 2020’ (Public Update) <<https://www.centralbankbahamas.com/viewPDF/documents/2020-09-25-18-25-20-PSDPublic-Update-20200925-Final.pdf>>.

<sup>175</sup> Ibid.

<sup>176</sup> Ibid.

<sup>177</sup> Ibid.

importance of integrating KYC requirements and security measures and investing robustly in programs to enhance end-user financial literacy and trust in financial services – is a good model for PICs over the longer-term to tackle financial inclusion challenges.

## VIII. CONCLUSION

Despite the challenges identified in section V and the resource costs associated with CBDC development, we conclude that emergence of CBDCs in PICs is likely only a matter of time. As shown in section III, the key drivers of CBDC development in the region are largely external to PICs and to their domestic monetary and payment systems. These drivers (risk of digital dollarisation due to extraterritorial use of foreign CBDCs, withdrawal of correspondent banking relationships and proliferation of privately issued cryptocurrencies) give PICs little room for manoeuvre: digital dollarisation, once in place, is difficult to reverse; correspondent banking requires cooperation of overseas financial institutions; and many (particularly fully decentralised) cryptocurrencies can be virtually immune to domestic regulatory intervention. As a result, we argue, PICs could opt to implement their own CBDCs, domestically, as an alternative measure – one that might (depending on the design) provide the toolset for dealing with all of these external pressures.

However, there is no one-size-fits-all approach to CBDCs for financial inclusion, no single accepted method of CBDC implementation, and no agreed technology or design underlying CBDCs. Global best practice could hardly be less settled. A CBDC is not only a complex kit of software – it is a complex digital framework capable of generating both economy-wide benefits and economy-wide shocks, as examined in this article.

In sufficient time, the issuance of CBDCs will almost certainly come to pass in the Pacific, as CBDCs could offer a simple and highly efficacious solution to (i) to the financial inclusion challenges of the region, which are driven mostly by geography; and (ii) the problem of high remittance costs that currently serve as a tax on the earnings of Pacific Islanders abroad, when they

seek to send some of their earnings to their families at home. In the Pacific, the design of any CBDCs will be determined by the central banks, but one envisages a centralised account structure in which the ledger sits with the central bank and the accounts are managed by the commercial banks and other reliable financial entities, may well be the preferred option. Whether the choice is for a token-based or account-based system probably depends mostly on internet penetration and smart phone usage rates. Thus the choices taken may well vary between PICs – with countries with poor internet connectivity far more likely to opt for token-based systems.

The establishment and operation of a CBDC by any Pacific nation will require considerable expertise and deep understanding of the design choices and issues to which this fundamentally new form of currency will give rise. In our view, now is not the time to issue a CBDC in the Pacific region: development of a safe, efficient, and accessible CBDC is likely to require regulators to redirect scarce resources away from the pressing challenges, such as enforcing anti-money laundering and counter-terrorism financing regulations while maintaining correspondent relationships with overseas commercial banks. Nonetheless, it is most certainly the time to begin to develop CBDC expertise and understanding. Understanding such matters requires focussed study and substantial time for reflection and working through all the consequences. PIC central banks need to establish internal units to research and explore the options around the design and implementation of CBDCs. If well designed and implemented, CBDCs offer a genuine and, most likely, the best solution to the financial inclusion and remittance problems that bedevil our region. Now is the time to begin laying the groundwork for this potentially game-changing innovation by developing the expertise required within the region's central banks.