

Central Bank Digital Currencies

(CBDC) index report

Focus: Asia region

Extract from PwC Global CBDC Index

September 2021



Introduction

CBDC Index report - Focus: Asia region

The emergence of Central Bank Digital Currencies (CBDC) is a key milestone in the evolution of money. While CBDC is a form of virtual money that uses an electronic record or digital token to represent cash, unlike other types of cryptocurrency, it is issued and regulated by a country's monetary authority.

To better fit our Vietnam market, this report is an extract from the inaugural **PwC Global CBDC Index** which was published in April 2021. Read the [full report here](#). This extract report provides a synthetic index, capturing the progress of central banks' in the Asia region, stance on CBDC development and public interest in two distinct use cases:

- Retail CBDC which are held directly by citizens and corporates;
- Interbank, or Wholesale CBDC which are restricted to Financial Institutions, principally for interbank payments and financial settlement processes.

We believe CBDCs will contribute significantly to the modernisation of the monetary landscape, as well as reinventing financial market settlement and interbank monetary transactions. We hope the insights and analysis from this report will provide useful data points in the ongoing transformation triggered by CBDCs.

Vietnam to join global peers in developing digital money?

There is no doubt that cryptocurrency has gained popularity here. In a recent Statista Global Consumer Survey conducted among 74 countries, Vietnam ranked 2nd based on the number of respondents who claimed that they used or owned cryptocurrency.

Favourable environment to nurture CBDC

Vietnam is marching towards a cashless society. Vietnamese people are no strangers to e-wallets and payment apps (e.g. Momo, Moca, ZaloPay, etc.) with 85% having at least one of them and 42% turning to contactless payment in 2020. Per Digital 2021: Vietnam report, our country had 154.4 million in term of mobile connection equivalent to 157.9% of our population in January 2021. With the government's projection of an annual growth rate of 20-25% for the number of cashless payment transactions, e-payments are likely to expand across the country, even to remote areas.

What's more, blockchain technology has gained momentum in the country recently. Notably, the Ministry of Information and Communications has endorsed akaChain, a blockchain platform backed by FPT Software to serve as a digital ID solution. In the private sector, many Vietnam-based blockchain projects have built up substantial following globally and locally: Axie Infinity, KardiaChain, My Defi Pet, etc.

These factors offer a favourable environment for the digital economy as well as CBDC to flourish.

A nod from the Government

Since 2017, the Vietnamese government has responded to the surging appetite on cryptocurrency by establishing various policies on managing virtual assets, cryptocurrencies and electronic currencies. This journey continues.

In Decision 942/QĐ-TTg issued on 15 June 2021, the State Bank of Vietnam (SBV) was tasked to research the pilot use of 'virtual money' based on blockchain technology in the next three years. In addition, SBV, the Ministry of Justice and the Ministry of Finance are studying the legal basis for managing virtual currency and virtual assets. MoF in 2020 had also set up a research group on this issue.

These efforts show the government's openness towards establishing a new type of currency. Although there is no official timeline for the 'virtual money' pilot programme to date, it is interesting to see how our local policy makers will take this initiative forward.

“

Our Vietnamese people will be one of the biggest beneficiaries of CBDCs as it will give them access for the first time to a digital form of central bank money. Decision 942/QĐ-TTg is welcomed as it puts Vietnam on the same playing field with other technologically advanced countries.”



Dinh Hong Hanh
Financial Services Leader
Partner, PwC Consulting Vietnam

Three trends to watch out for in 2021

CBDC projects are gaining traction

More than 60 Central Banks have been exploring CBDCs since 2014.

Progress has been **accelerating** with some CBDC projects now entering implementation phases.

Institutional involvement in CBDC continues to strengthen the ecosystem at large, with public stakeholders such as the Bank for International Settlements, the World Bank, the International Monetary Fund or the World Economic Forum, active on the topic.

CBDCs are now live Transactional volumes should be interesting to monitor

Central Banks are working on two main CBDC operational designs:

- **Retail** applications, where CBDCs can be directly held by citizens and corporates as a form of digital cash.
- **Interbank or wholesale** applications, where CBDC use is restricted to financial institutions, namely for interbank transactions and financial settlement.

Retail CBDC projects appear to be more advanced in emerging economies with **financial inclusion** stated as an expected outcome. Wholesale efforts are mostly conducted in more advanced economies, with more developed **interbank systems and capital markets**.

Looking at the most advanced projects globally, retail efforts have already produced **two live projects** in the Bahamas and Cambodia. No interbank/wholesale CBDC projects have reached this maturity level yet. However, nearly 70% of declared wholesale projects are already running pilots, while only 23% of retail projects reached this implementation stage.

Blockchain is the technology of choice

More than 88% of CBDC projects, at pilot or production phase, use blockchain as the underlying technology.

Whilst a blockchain is not always necessary to create digital tokens, blockchain technology brings several benefits to CBDC developments. Namely:

- Integrated platforms built by design to share value and **transfer ownership in a secure way**, which is key to supporting digital money;
- Smart contract **programmability**, supporting CBDC as a new form of programmable monetary instrument that could trigger automatic payments based on pre-programmed conditions;
- Transparent **audit** trails;
- Configurable **confidentiality** features;
- Increasing **interoperability** with other digital assets through atomic swaps.

Research methodology

| | |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data source | BIS*, Central Bank websites, Atlantic Council, Press, Central Banks, Google Trends, Baidu Index and PwC Analysis |
| Index composition | <p>The objective of this index is to provide an overview of the development of CBDC globally.</p> <p>The primary variable is the CBDC project status, indicating the current stage of project development. Two other variables capture the stance of the central bank based on published speeches, and a public interest proxy (Google Trends or Baidu Index).</p> <p>This index is technology agnostic: each countries' design choices (infrastructure, technologies, etc.) has no index impact.</p> |
| Composition rationale | <p>We analysed the following aspects of the three indicators introduced by BIS, based on the BIS data update release in December 2020:</p> <p>CBDC projects' status tracks three stages of development - namely, research, pilot and production. Given the trend that more and more CBDC projects entered into pilot phases, we introduced more detailed development stages in the pilot phase (i.e. proof-of-concept, development, implementation and completion). The more advanced a CBDC project is, the higher score it receives. In addition, bonus points are allocated, based on the duration of the corresponding pilot projects, to simulate the project progress. For example, we expect on average a retail CBDC pilot project would complete its conceptual stage within one year from the start of their pilot project (or we expect that a retail pilot project takes three years to reach a conclusion and six years for a wholesale project.)</p> <p>CB speech stance measures the recent average opinion expressed by Central Bankers captured within the BIS central bankers' speeches databases. This indicator aims to provide information about the future of the project status and legal aspects.</p> <p>Public interest proxy is the average score of Google Trends (for projects outside Mainland China) and Baidu Index (for Mainland China only) during the recent periods. It represents recent trends of general public interest. It suggests potential collaborative interest from private sectors, who could support future project advancement.</p> |
| Quality review | <p>We made an extensive use of the BIS data, and subjected the analysis to several rounds of review prior to publication. Furthermore, a quality review is performed on index distribution and ranking changes to evaluate data robustness.</p> <p>An expert judgement is undertaken on scores allocated to each qualitative indicator, i.e. CBDC projects' advancement status, CB speech stance before each publication.</p> |

* 'Rise of the central bank digital currencies: drivers, approaches and technologies', BIS working paper, No 880, August 2020 (updated December 2020) by Auer, R, G Cornelli and J Frost.

Retail CBDC index

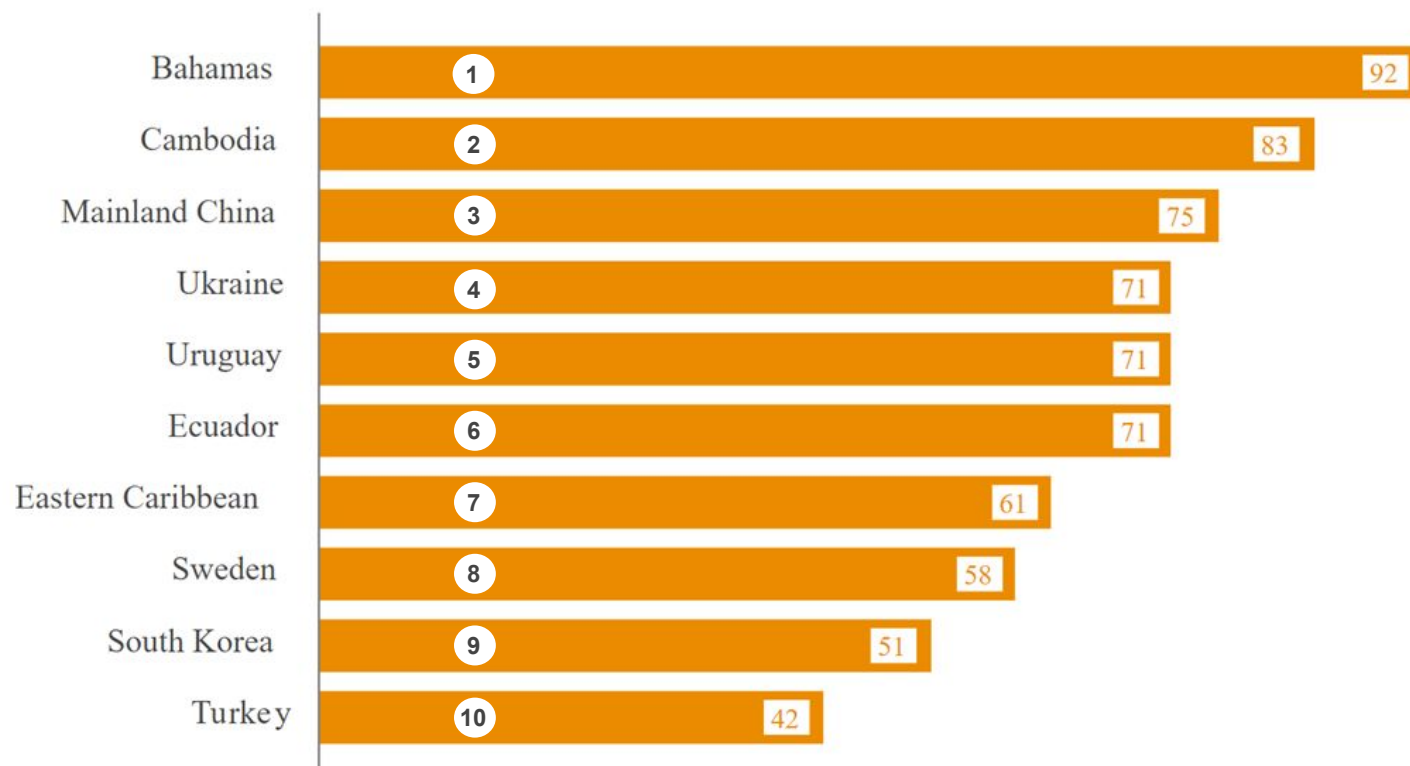
Retail CBDC can be directly held by citizens and corporates as the digital equivalent of banknotes and coins. It offers a new platform for holding and exchanging money.

Get a snapshot of the Retail CBDC project maturity globally and read more about the most mature retail CBDC projects in Asia

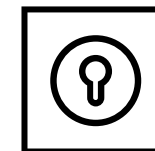


Project Maturity - Retail CBDC development

Top 10 - Retail CBDC projects



Source: BIS Working paper No 880, December 2020 update and PwC analysis. Rebased against an index of 100, and is dependent on the availability of data.



Key insights

- Retail CBDC initiatives are particularly strong in **emerging economies**, where financial inclusion and digitisation appear as key drivers.
- Two projects are now **live**; the **Bahamas with the Sand Dollar** and **Cambodia, with project Bakong**. It is still too early to capture uptake data on CBDC usage but 2021 should produce further interesting insights.
- The **Digital Yuan project in Mainland China** has already reached an advanced level of trialling, with more than 2 billion yuan (~\$300m) in transactions and is reportedly preparing for broader usage at the Beijing 2022 Winter Olympics.

Asia ranking



1st

Index value



83

Retail index

Global ranking



2nd

Project name:
Bakong Project

Top 3 - Retail projects in Asia

Focus on Cambodia

- The National Bank of Cambodia (NBC) started exploring digital currencies in June 2018.
- Project Bakong, a Distributed Ledger Technology (DLT)-based interbank payment system, was tested in July 2019 and officially launched in October 2020: it currently links 11 domestic commercial banks and payment processors. Since [October 2019](#), the NBC has also started experimenting with digital wallets for cross border transactions with Maybank, a Malaysian-based bank, allowing the possibility of Cambodian citizens working in Malaysia, to transfer funds to Cambodia with much lower costs than before. In [August 2021](#), NBC announced Maybank Malaysia as first international transfer partner.
- Bakong aims to increase financial inclusion, in a country where most citizens are not accustomed to using bank accounts but mobile phone utilisation is high. It also allows interbank, real time electronic transactions and promotes transactions in Cambodian riels, compared with today where the bulk of transactions are in US Dollars.
- Bakong will support rural financial sector development, easing access to credit for SMEs and will provide targeted lending products for micro enterprises.

Link to Central Bank Project:

<https://bakong.nbc.org.kh/>

Asia Ranking



2nd

Index value



75

Retail index

Global ranking



3rd

Project name:
DC/EP

Top 3 - Retail projects in Asia

Focus on Mainland China

- Mainland China began the development of a retail CBDC in 2014. In April 2020, Mainland China became the world's first major economy to pilot a digital currency. The pilot programs, conducted in its four major cities, (most notably Shenzhen in October 2020), have shown that the digital yuan works when paying for goods.
- The aim of DC/EP (Digital Currency/Electronic Payment) is to improve the convenience, the efficiency and the resilience of the retail payment system, which could further strengthen the yuan's monetary sovereignty and internationalisation. Its design features offer the potential to replace M1 (cash currency in circulation, such as coins and banknotes) and it could be functional both online and offline. The regulator does not expect it to replace long-term deposits in bank accounts.
- Mainland China adopts a hybrid approach for its technical design, with the People's Bank of China (PBoC) issuing DC/EP to commercial banks who then distribute it to the public. This offers the possibility of recording the flow of the digital currency between users, providing the PBoC with greater visibility on the use of money.
- The Digital Yuan project has already reached an advanced level of trialling, with more than 2 billion yuan (~\$300m) having been issued. Despite the fact that some crucial aspects like an estimated launch timeline remain undisclosed, Mainland China is currently believed to be preparing for widespread domestic use of DC/EP during the Beijing 2022 Winter Olympics.

Link to Central Bank Project:

No official website

Asia ranking



3rd

Index value



51

Retail index

Global ranking



9th

Project name:
E-won

Top 3 - Retail projects in Asia

Focus on Korea

- The Bank of Korea (BOK) launched its 22-month pilot trial in March 2020 to explore the potential use of a digital currency. According to the BOK's published plan, the pilot projects involves three stages.
- The first stage, completed in July 2020, was to identify the design and technical requirements, including determining the technology to be used, such as blockchain. The second stage, scheduled from September 2020 to December 2020, was designed to analyse operational procedures for a CBDC rollout with external partnerships. The third stage, which would be a 12-month testing and implementation period, is to launch the pilot system in a limited and virtual environment and to run tests on the functionality and security of the platform.
- In February 2021, BOK published a report in which they reviewed the CBDC-related legal issues and presented possible revisions on related laws, especially the Bank of Korea Act. The report re-confirmed the timelines of the project phases detailed above.
- In July 2021, BoK named Group X, a blockchain affiliate of technology giant Kakao Corp, as their principal technology supplier for the pilot E-won programme.

Link to Central Bank Project:

<http://www.bok.or.kr/portal/bbs/P0000559/view.do?nttId=10057475&menuNo=200690>

<https://www.bok.or.kr/portal/bbs/B0000232/view.do?nttId=10062867&menuNo=200725>

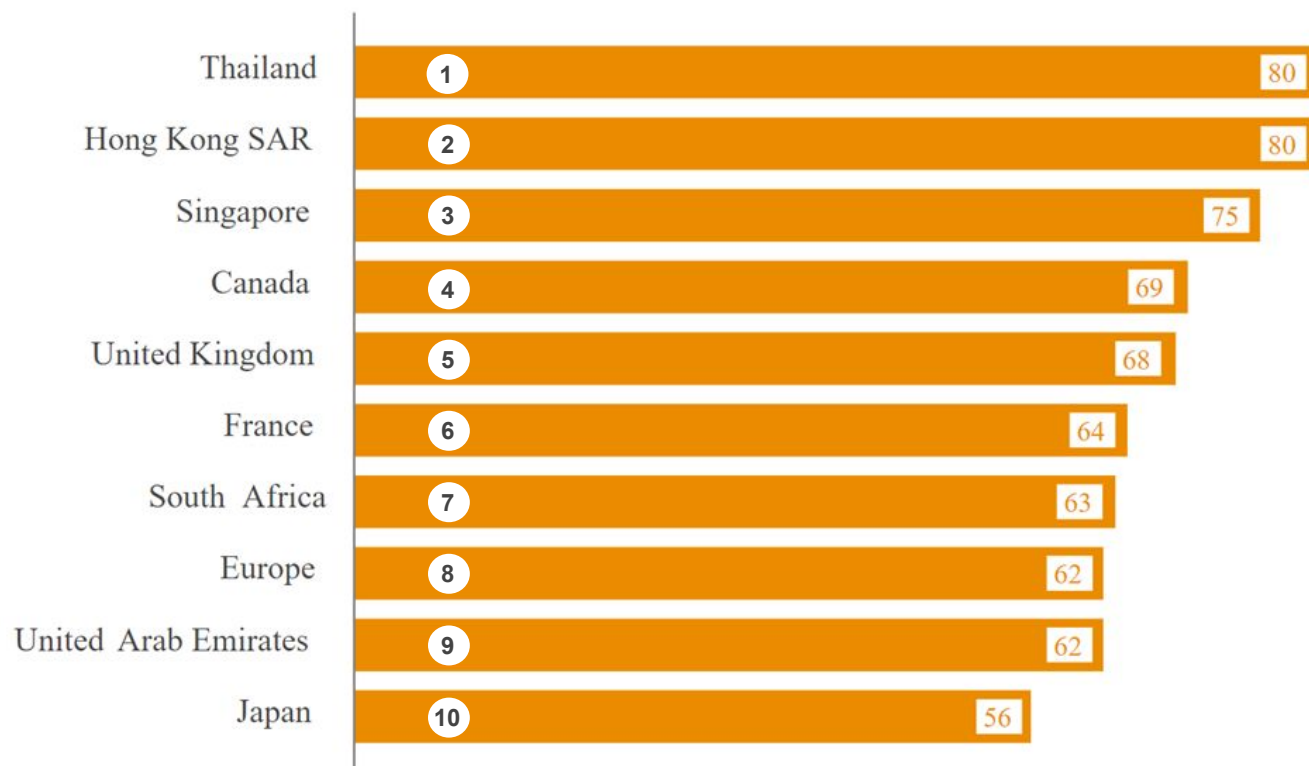
Interbank or wholesale CBDC

Interbank/Wholesale CBDC is restricted to use by Financial Institutions alone for interbank payments and financial settlement processes.

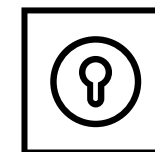
Get a snapshot of the Interbank CBDC project maturity globally and read more about the most mature Interbank CBDC projects in Asia

Project Maturity - Interbank CBDC development

Top 10 - Interbank or Wholesale CBDC projects



Source: BIS Working paper No 880, December 2020 update and PwC analysis. Rebased against an index of 100, and is dependent on the availability of data.



Key insights

- Advanced Interbank/Wholesale CBDC projects have on average **shorter research stages** than retail programmes but **longer pilot stages**. There are no live projects as yet but there are **very advanced pilot initiatives**.
- **Cross-border** projects make up the majority of the most advanced initiatives, allowing Central Banks to test cross-border connectivity and project **interoperability**, examples include Hong Kong SAR-Thailand, Singapore-Canada, Europe-Japan, United Arab Emirates-Saudi Arabia.
- Most advanced interbank/wholesale projects are **expanding their scope** to test **interconnectivity** with other interbank projects or the potential of **linking with retail** projects.

Asia ranking



1st

Index value



80

Wholesale index

Global ranking



1st

Joint

Project name:
Inthanon-LionRock

Top 3 - Interbank/Wholesale projects in Asia

Focus on Hong Kong SAR and Thailand

- The Hong Kong Monetary Authority (HKMA) commenced Project LionRock in 2017. Initial research findings highlighted the huge potential of CBDC adoption for wholesale and cross-border payments.
- In 2019, to test the application of CBDC in cross-border payments, the HKMA and the Bank of Thailand (BOT) initiated Project Inthanon-LionRock. The joint study entered Phase 2 this year, with the purpose of developing a software prototype to enable cross-border settlement in CBDC and to explore a range of different use cases.
- The joint study is also seeking to evolve from bilateral cross-border use cases to ones involving multiple jurisdictions and multiple currencies. It was announced at the Asian Financial Forum in early January 2021 that the UAE and Mainland China are also joining the initiative.
- Of note, the Hong Kong SAR CBDC study is also combining wholesale with retail use cases. Moreover, the HKMA is closely coordinating with The People's Bank of China (PBOC) to explore the possibility of mutual connectivity with Mainland China's DC/EP for cross-border payments to enhance Hong Kong SAR's position as a global hub for offshore Renminbi (RMB) business.

Link to Central Bank Project:

<https://www.hkma.gov.hk/eng/news-and-media/press-releases/2020/01/20200122-4/>

Asia ranking



2nd

Index value



75

Wholesale index

Global ranking



3rd

Project name:
Ubin

Top 3 - Interbank/Wholesale projects in Asia

Focus on Singapore

- 13 July 2020 marked the completion of Project Ubin's final, and the fifth phase of Singapore's exploratory project in CBDC. In this last phase, the Monetary Authority of Singapore, (MAS), announced the completion of a range of tests of blockchain-based payments solutions supporting various currencies. This last phase included development of the interfaces to establish connections to other blockchain networks. These interfaces can support various use-cases such as delivery-versus-payment with private exchanges, conditional payments, trade escrow, and trade finance payment commitments.
- Moving forward, MAS is encouraging further collaboration with other central banks and has publicly announced its intention to cooperate with the People's Bank of China. Following Project Ubin, to improve the efficiency of wholesale payments, several institutions, namely DBS, J.P. Morgan and Temasek, are developing a blockchain-based clearing and settlement network. The network is seeking to use Singapore as a base and expand from there to other jurisdictions.

Link to Central Bank Project:

<https://www.mas.gov.sg/schemes-and-initiatives/project-ubin>

Asia ranking



4th

Index value



56

Wholesale index

Global ranking



10^t
h

Project name:
Stella

Top 3 - Interbank/Wholesale projects in Asia

Focus on Japan

- The Bank of Japan (BOJ) has been engaged in a joint research project - Project Stella - with the European Central Bank (ECB) since December 2016. To date, Phases 1 to 4 have been completed. Whilst the BOJ does not have immediate plans to issue a CBDC, it has emphasised the importance of preparatory work, driven by the following:
 - ❖ Given the rapid rate of technology innovation and advancement, public interest for CBDC may increase tremendously;
 - ❖ BOJ should ensure a stable and efficient payment and settlement system.
- To complement the wholesale project, BOJ will work towards a retail proof of concept the objective of which is to study the technical functionality of the key features. The BOJ may launch a pilot program that will include payment service providers (PSPs) and end users, if needed. There will be two phases of the proof of concept:
 - ❖ Phase 1, commencing 2Q 2021, will focus on the development of a test environment and trialing of core functions;
 - ❖ Phase 2, will address the implementation of additional functions in the test environment alongside a feasibility test.
- More broadly, the BOJ continues to explore institutional set up and close coordination with a range of stakeholders.

Link to Central Bank Project:

<https://www.boj.or.jp/en/paym/digital/index.htm/>

“

Across Asia, these CBDC success stories as well as the development of virtual or digital banking licenses serve as fundamental stepping stones to advancing financial inclusion. Our government has already initiated the introduction of a national financial inclusion strategy by 2025 with an orientation towards 2030 under Decision No.149/QD-TTg. As to when CBDC becomes a reality in Vietnam will depend on the legal framework and policies that support the issuance and the distribution of regulated digital currency and address security risk concerns. This is a clear call for regulators and financial institutions to come together for a harmonised approach.”



Vo Tan Long

Chief Digital Officer and Consulting Leader
Partner, PwC Consulting Vietnam

Contact us



Vo Tan Long

General Director
+84 90 343 7280
vo.tan.long@pwc.com
PwC Consulting Vietnam



Dinh Hong Hanh

Partner - Financial Services Leader
+84 904 178 556
dinh.hong.hanh@pwc.com
PwC Consulting Vietnam

www.pwc.com/vn



Authors: Pauline Adam-Kalfon, Henri Arslanian, Klara Sok, Benoît Sureau, Haydn Jones and Yanjie Dou

We would like to thank all the contributors to this publication and in particular :

Adrian Keller, Alexander Yip, Ali Ulasan, Alistair Sinclair, Andrew Teare, Bastian Stolzenberg, Bérénice de Beauvais, Chikako Suzuki, Davide Di Stefano, Emanuele Coscia, Galen Law-Kun, Henri Loh, Joanna Robinson, Kevin Cambridge, Khin Hong Kee, Marco Monaco, Marius Manole, Masahiro Miura, Matthew Blumenfeld, Maxime Lévy-Shapira, Mohil Subban, Myra Lundy-Mortimer, Patryk Czerwony, Paul Cheval, Paul Chew, Paul Keyrouz, Robert Donovan, Serena Sebastiani, Timothée Bavelier, Tomoyuki Ashizawa, Tristan Muratore, Wanyi Wong, Wei Jie Chan, Wyn Hui Wan.

This publication has been prepared for general guidance on matters of interest only and does not constitute professional advice. You should not act upon the information contained in this publication without obtaining specific professional advice. No representation or warranty (express or implied) is given as to the accuracy or completeness of the information contained in this publication, and, to the extent permitted by law, PwC does not accept or assume any liability, responsibility or duty of care for any consequences of you or anyone else acting, or refraining to act, in reliance on the information contained in this publication or for any decision based on it.

©2021 PwC (Vietnam) Limited. All rights reserved. PwC refers to the Vietnam member firm, and may sometimes refer to the PwC network. Each member firm is a separate legal entity. Please see www.pwc.com/structure for further details.