WINSTON MA, KEN HUANG
FOREWORD BY ANTHONY SCARAMUCCI, CLAY LIN AND YALE YUHANG LI

# BLOCKCHAIN AND WEB3

## BUILDING THE CRYPTOCURRENCY, PRIVACY, AND SECURITY FOUNDATIONS OF THE METAVERSE


WILEY

# Praise for *Blockchain and Web3*

"A thoughtful guide to the role blockchain and crypto assets play in the world-changing internet transformation – and how one accelerates the other."

**— Anthony Scaramucci, Founder & Managing Partner of SkyBridge**

"Provides a colorful account of how things like gaming, blockchain, NFTs, AR/VR, DAOs, and DeFi have converged and ultimately presented to us this whole package called metaverse."

**— Clay Lin, Chief Information Security Officer (CISO), World Bank Group**

"Ma and Huang provide the essential handbook on the transformative power of Web 3 – taking you on a ride from the basic fundamentals of the blockchain protocols to the vast possibilities of the metaverse – and the immense impact it could bring. An educational and entertaining must-read for anyone interested in the next, programmable and immersive, web."

**— Lila Tretikov, deputy Chief Technology Officer (CTO), Microsoft**

"An essential breakdown of the most important recent developments in the blockchain space. Unlike many other writers, Ma and Huang look beyond mere financial speculation to uncover the true productive potential of blockchains, smart contracts, DAOs, DeFi, the metaverse, and more."

**— Neel Mehta, Author of *"Bubble or Revelation?: The Future of Bitcoin, Blockchains, and Cryptocurrencies"***

"A remarkable convergence of digital economy with blockchain and Web3, depicting the true merits of the metaverse in relinquishing the impending daunted horizons of the information technology."

**— Mehdi Paryavi DEA®, Chairman, the International Data Center Authority (IDCA)**

"A clear picture of the complex ecosystem that enables the next-generation internet. Readers will become "Web3 smart" netizens, educated participants, and even adept game changers."

**— William Zhang, Security Architecture Lead, World Bank Group**

"Provides a valuable window into metaverse and covers the important building blocks for a trusted metaverse."

**— Yale Li, Chairman, Cloud Security Alliance – Greater China Region (CSA GCR)**

"Metaverse, Web3, and blockchain are among the cutting-edge technologies of the new digital economy. Focused on security, privacy, and data governance, this book discusses the paramount aspects of how these new technologies are used in the real world."

**— Yao Qian, Ex-Head of China's Digital Yuan Effort, now Director of the Science and Technology Supervision Bureau of China Securities Regulatory Commission**

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*To Angela – I love you dearly.*

*– Winston Ma*

*To Queenie Ma, Grace Huang, and Jerry Huang, for your unwavering love, support, and encouragement.*

*– Ken Huang*

# Contents

# Foreword

## Great Leap Forward into Web3

In September 2017, JPMorgan Chase (America's largest investment bank firm) CEO Jamie Dimon called Bitcoin a "fraud." "It's worse than tulip bulbs. It won't end well. Someone is going to get killed," Dimon said. Now, its wealthiest clients can invest in the asset on the bank's own platform. The dramatic shift of JPMorgan is a significant milestone for the Bitcoin, as well as broad cryptocurrencies, as an asset class.

Various financial institutions like JPMorgan, both on Wall Street and in international governments, have had a very complicated relationship with cryptocurrency as a whole since Bitcoin (together with blockchain technology) first crashed onto the world stage 10 years ago. But as digital finance has accelerated by the pandemic, institutions actively explore new avenues to get involved in the crypto space. This institutional adoption has benefited not only Bitcoin but also the entire crypto asset industry, helping break barriers all across the board.

For example, Morgan Stanley, which has the country's largest wealth management unit with nearly $5 trillion in assets under management and advisement, has created Bitcoin products on its platform for ultra-high-net-worth investors. U.S. Bank, which is part of U.S. Bancorp, the fifth-largest bank in America announced a new cryptocurrency custody product. Goldman Sachs and other Wall Street banks have started looking into how to use bitcoin as collateral for cash loans to institutions.

Going beyond crypto investments and trading, Bank of America recently released a major research report, stating that they see a massive opportunity in the *Metaverse,* and that it could spur the wider adoption of the crypto industry. One of their top strategists said that he expects large traditional financial companies to enter the space once crypto assets gain wider adoption and usage in the metaverse, and it will finally cause cryptocurrencies to start being used widely for transactions.

In short, Bitcoin, crypto assets, and decentralized technologies (including blockchain) are much more than its financial origins, and this is becoming apparent around the world. Instead, it's about a new, better internet known as Web3. Digital assets and Web3 projects are radically changing how we invest, strategize business models, and deploy products and services. These projects have not only disrupted the thinking of institutional and professional investors, but also have inspired global brands and entrepreneurs to develop new products and services for both the physical and virtual worlds.

Blockchain is the backbone of Web3, which may be the next major platform in computing after the World Wide Web (Web1.0) and mobile internet (Web2.0). It is poised to revolutionize every industry and function, from finance and health care to media entertainment and real estate, creating trillions in new value – and the radical reshaping of society.

Ma has produced a terrific and highly accessible field guide to understanding how the digital economy is accelerating in the Web3 metaverse. A nationally certified software programmer as early as 1994, Ma has published many books on global tech revolution, including *The Hunt for Unicorns: How Sovereign Funds Are Reshaping Investment in the Digital Economy* (2020) and *The Digital War – How China's Tech Power Shapes the Future of AI, Blockchain, and Cyberspace* (2021). For both, I made similar book recommendations to major financial institutions, asset managers, hedge funds, as well as other key players and stakeholders.

As an investor, attorney, author, and adjunct professor in the global digital economy, Ma addressed the crypto-based

Web3 metaverse from various perspectives, together with his co-author Ken Huang, a blockchain security expert. The authors' extensive, hands-on involvement in the deals and operations of this mystical world lends vibrancy as they recount practical, illustrative examples in a non-pedantic style. Together, their unique perspectives and differing approaches have produced a nuanced roadmap to the little-known past and exciting prospects of blockchain internet.

Sometimes a book sheds light on a little-known but powerful force. Sometimes it is timely because it catches the world at an inflection point. Rarely does a book accomplish both. With the arrival of *Blockchain and Web3* from Winston Ma and Ken Huang, we have that rare beast: a book that, against the backdrop of the world-altering coronavirus epidemic, provides a thoughtful guide to the role blockchain and crypto assets play in the world-changing internet transformation – and how one accelerates the other.

Anthony Scaramucci
Founder and Managing Partner of SkyBridge

## The Opportunities and Challenges of Metaverse

Covid-19 has accelerated digital transformation across the globe, from virtual meetings and electronic signatures to digital payments and remote supervision, just to name a few. In the meantime, another strong force is shaping up the next-generation internet, or Web3. We often hear the ingredients of Web3: blockchain, decentralized finance or DeFi, nonfungible tokens (NFTs), and most recently the metaverse. We hear the opportunities as well as challenges these emerging technologies bring about to individuals, organizations, and regulators, and become anxious every day.

As a fast-evolving field, Web3 and its enabling technologies are developing very rapidly. This makes it hard for people to stay current and make informed decisions as to how to take

advantage of the opportunities, how to manage the risks, or simply, how to participate.

Luckily, Winston Ma and Ken Huang have provided readers of this book a very detailed picture of the current Web3 landscape. Having been practitioners in this space for many years, Winston and Ken give us a vivid account of the major events and players in each of the fields in the Web3 ecosystem, from technology innovation, new business models, participation by established companies whose current business may be disrupted, the various types and stances of cybersecurity hacks, to reactions from government regulators. This holistic view is beneficial for people to understand the development of this dynamic and complex ecosystem before they can take informed actions.

The year 2021 was marked as the year of the NFTs, when it became a buzzword for the masses and brought us landmark deals worth multimillion dollars. But many people do not understand what exactly they are getting into when they purchase an NFT generated from things like digital art. The recent story of the avid NFT collector, who paid $2.9 million for an NFT in 2021 but was not able to even get a bid close to $10,000 a year later, shows that people have different perceptions of what an NFT represents and what its intrinsic value is. Chapter 5 of the book provides the audience with useful information on this topic.

As Facebook changed its name to Meta in 2021, and Microsoft acquired gaming company Activision Blizzard for $68.7 billion in early 2022, many are puzzled about the value proposition of the metaverse, and what it means for them. The book provides a colorful account of how things like gaming, blockchain, NFTs, AR/VR, DAOs, and DeFi have converged and ultimately presented to us this whole package called metaverse. The chapters also present the challenges and opportunities that metaverse faces, prompting the audience to think about what these mean for their organization and for themselves.

Congratulations to Winston and Ken on a comprehensive and easy-to-read book that offers so much information and presents so many intriguing open questions for the audience to ponder and act on. Their research will elevate the level of understanding of Web3 by the blockchain and fintech communities and trigger actions that will help shape the next-generation internet for the benefit of humanity!

Clay Lin
Chief Information Security Officer (CISO)
World Bank Group

## Blockchain: The Building Blocks of a Trusted Metaverse

Metaverse was predicted 30 years ago in Neal Stephenson's novel *Snow Crash,* where people interact as avatars within a high-definition virtual environment projected onto special goggles. Today, new digital technologies like blockchain will gradually join up and form the building blocks of the future metaverse, which could be the next generation of internet capable of transmitting 3D holograms and a lot more.

However, there are numerous potential obstacles – from technological and economical to political, security, and many other aspects – we must overcome to pave the way of the metaverse. From cloud computing's perspective, the majority of metaverse platform components will have to run on a secured cloud environment, which enforces zero trust and embraces blockchain innovations such as privacy preserving computing, decentralized storage, and decentralized identity as described in this book.

This book provides a valuable window into metaverse and covers the important building blocks for a trusted metaverse. Particularly, it explains blockchain as a critical technology to converge with metaverse. Cryptocurrencies, DeFi, NFT, gaming tokens, and other usage scenarios are discussed extensively in the book. Security and privacy have always been challenges

to the internet and the digital world, and fortunately, they are paid full attention in the book as well. I have no doubt that you would enjoy state-of-the-art knowledge and insights on the metaverse from the book, whether you are a businessperson, tech investor, technical professional, government official, or student at college.

The authors of this book are senior experts Ken Huang and Winston Ma in the industry and academia. For many years, I have been very impressed with Ken's research leadership as VP of Research at CSA GCR. Being a recognized technology leader in blockchain field, Ken has published many standards, white papers, and training contents. In 2021, he won the award of "60 Blockchain Leaders" in China. I truly believe that no one else could share the convergence of blockchain and metaverse better than Ken and Winston.

Happy Reading,
Yale Yuhang Li
Foreign Member, Ukrainian Academy
of Engineering Sciences
Chairman, Cloud Security Alliance –
Greater China Region (CSA GCR)
Seattle, Washington USA

# Acknowledgments


## Winston Ma

In the middle of 1990s, the early days of China's tech and internet boom, I majored in electronic materials and semiconductor physics at Fudan University in Shanghai. Aiming for graduate studies in the United States, I diligently studied English for the TOEFL and GRE exams, and I also took a national exam for a professional certificate that is no longer relevant two decades later – "software programmer."

Back then, China had so few software programmers that the central government organized national qualification exams to encourage the young generation to study computer science. Sensing the tremendous potential of China's tech revolution, I sat in a one-day exam to solve coding problems in C, Fortran, and Pascal languages before I became a "nationally certified software programmer." Today, however, those programming languages are "old" for coding, and there is no need for such a national exam because numerous college students graduate from computer science majors, driven by the mobile internet boom started last decade and the Web3 revolution emerging post-Covid-19 pandemic.

That's why my 2022 book focuses on *Blockchain and Web3*, after my pentalogy on China's digital revolution and tech power in the previous five years, because we are entering into a new global era of digital transformation. A book on such a complex and fast-moving topic would not have been possible if I had not been blessed to partner with an industry leader like Ken, who has over 20 years of cybersecurity and blockchain technology

experience in cloud security, identity and access management, and PKI and date encryption.

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My deepest thanks go to Dr. Rita and Gus Hauser, the New York University (NYU) School of Law, and John Sexton, the legendary dean of NYU Law School when I was pursuing my LL.M degree in Comparative Law. My PE/VC investing, investment banking, and practicing attorney experiences all started with the generous Hauser scholarship in 1997. During his decade-long tenure as the president of NYU, John kindly engaged me at his inaugural President's Global Council as he developed the world's first and only GNU (global network university). My NYU experience was the foundation for my future career as a global professional working in the cross-border business world.

My sincere appreciation to both Mr. Lou Jiwei and Dr. Gao Xi-qing, the inaugural chairman and president of China Investment Corporation (CIC), for recruiting me at its inception. One of the most gratifying aspects of being part of CIC is the opportunity to be exposed to a wide range of global financial markets' new developments. The unique platform has brought me to the movers and shakers everywhere in the world, including Silicon Valley projects that linked global tech innovation with the Chinese market.

The same thanks go to Chairman Ding Xue-dong and President Li Ke-ping, who I reported to at CIC in recent years. Similarly, thanks to Linda Simpson, senior partner at the New York headquarters of Davis Polk & Wardwell, and Santosh Nabar, managing director at the New York headquarters of JPMorgan. Those two former bosses on Wall Street gave me a foundation to develop a career in the global capital markets.

Many thanks to Mr. Jing Liqun, president of Asian Infrastructure Investment Bank (AIIB) and formerly the supervisory chairman of CIC. He educated me about the works of Shakespeare, as well as guiding me professionally. The readings of

*Hamlet*, *Macbeth*, and *King Lear* improved my English writing skills, and hopefully the writing style of this book is more interesting and engaging than my previous finance textbook *Investing in China*.

For such a dynamic book topic, I benefited from the best market intelligence from a distinctive group of institutional investors, tech entrepreneurs, and business leaders at the World Economic Forum (WEF), especially the fellows at the Council on Long-Term Investing, the Council for Digital Economy and Society, and the Young Global Leaders (YGL) community. Professor Klaus Schwab, founder and executive chairman of the World Economic Forum, has a tremendous vision of a sustainable, shared digital future for the world, which is an important theme of this book.

The WEF Council on Long-Term Investing has gathered the most forward-thinking leadership from major sovereign wealth funds and public pensions, and I learned so much from the dynamic discussions with them for this book's coverage on the sovereign digital currency. They include Alison Tarditi (CIO of CSC, Australia), Adrian Orr (CEO of NZ Super, New Zealand), Gert Dijkstra (chief strategy of APG, Netherlands), Hiromichi Mizuno (CIO of GPIF, Japan), Jagdeep Singh Bachher (CIO of UC Regents, USA), Jean-Paul Villain (director of ADIA, UAE), Lars Rohde (CEO of ATP, Denmark), Lim Chow Kiat (CEO of GIC, Singapore), Reuben Jeffery (CEO of Rockefeller & Co., USA), and Scott E. Kalb (CIO of KIC, Korea).

My gratitude goes to many other outstanding friends, colleagues, practitioners, and academics who provided expert opinions, feedback, insights, and suggestions for improvement. For anecdotes, pointers, and constant reality checks, I turned to them because they were at the front line of industry and business practices. I would particularly like to thank my partners at CloudTree Ventures (a VC fund focusing on the technologies driving interactive entertainment and the metaverse), Trevor Barron, Jeffery Schoonover, and Adam Smith, as well as the friends at Capgemini, where I am a member of its advisory

board, including Cornelia Schaurecker (Global Group Director AI & Big Data of Vodafon), Lila Tretikov (deputy CTO of Microsoft), and Mishka Dehghan (SVP Strategy, Product, & Solutions Engineering of T-Mobile).

On its journey from a collection of ideas and themes to a coherent book, the manuscript went through multiple iterations and a meticulous editorial and review process by the John Wiley team led by the book commissioning editor Gemma Valler. Our long-term collaboration started with my 2016 book, *China's Mobile Economy*. During the pandemic, we released *The Hunt for Unicorns: How Sovereign Funds Are Reshaping Investment in the Digital Economy* (2020) and *The Digital War – How China's Tech Power Shapes the Future of AI, Blockchain and Cyberspace* (2021). The managing editor Purvi Patel and copyeditor Cheryl Ferguson contributed substantially to the final shape of the book. Special thanks to Gladys Ganaden for her design of the book cover and figures.

And last in the lineup but first in my heart, I thank my wife, Angela Ju-hsin Pan, who gave me love and support. You are a true partner in helping me frame and create this work. Thanks for your patience while I wrecked our weekends and evenings working on this book.

## Ken Huang

At the end of 2016, I resigned from my role overseeing blockchain technology strategic research and fintech product development at Huawei. The main reason for my resignation is that decentralization technology and its associated innovation cannot happen inside Big Tech companies.

That is the main theme of this book. As I worked with my co-author, Winston Ma, to develop the contents of this book, it became even more clear that blockchain technology innovations will happen in a metaverse, led by many small startups.

I am very thankful for Winston Ma, who has come up with the initial idea of the book and developed the book contents as

decentralization technology and tokenomics innovations have sped up during the global pandemic.

I am also very much indebted to Sally Gao, an alumna of McKinsey and Company, Chinese tech VC Sinovation Ventures, and Columbia University. She has contributed all figures of the book, created the Glossary section, and translated some of my contents from Chinese to English.

I certainly enjoyed long walks and deep discussions of Blockchain, DeFi, NFT, and Metaverse ideas with my daughter, Grace Huang, who is a product manager of PIMCO, an American investment management firm. This upcoming generation is promising, as lots of the good points from this book were the results of discussions with my daughter. Thank you to my wife, Queenie Ma, and my son, Jerry Huang (who is completing his master's degree and is also working as a teacher assistant for a blockchain course at Georgia Institute of Technology) for their love and encouragement as well as insightful discussions about the book.

I am also very grateful to the following individuals for forming my view of decentralization, blockchain security, privacy, DeFi, and metaverse applications in the past few years, including and in no particular order:

- Michael Casey, chief content officer of CoinDesk, for insightful discussion on privacy and self-sovereign identity
- Vitalik Buterin, co-founder of Ethereum, for discussion on blockchain scaling solution, privacy, sharding, layer 2, and many other topics
- Dr. Xiao Feng, chairman of Wanxiang Blockchain, for his support and comments on my previous book on blockchain security and continued discussion afterward
- Dr. Yao Qian, ex-head of China's Digital Yuan (CBDC) Effort and now director of the Science and Technology Supervision Bureau of the China Securities Regulatory Commission, for many discussions on the original CBDC design and related issues and concerns

- Professor Whitfield Diffie of Stanford University, for good discussions on cryptography and privacy
- Professor Jim Waldo of Harvard, who taught me at the Harvard Kennedy School executive program on Cybersecurity: The Intersection of Policy and Technology
- Clay Lin, CISO of World Bank Group, for many discussions on blockchain and his support for my previous book
- Yale Lee, chair of Cloud Security Alliance (CSA)-GCR, for collaborative works on blockchain security white papers published by CSA

# About the Authors

## Winston Wenyan Ma, CFA & Esq.

Winston Ma is an investor, attorney, author, and adjunct professor in the global digital economy. He is a co-founder and managing partner of CloudTree Ventures, a seed-to-early-growth-stage venture capital firm empowering interactive entertainment companies. He is currently the board chairman of Nasdaq-listed MCAA, a European tech SPAC, an advisory board member of Capgemini, and an adjunct professor at NYU Law School.

Most recently for 10 years, he was managing director and head of North America Office for China Investment Corporation (CIC), China's sovereign wealth fund. At CIC's inception in 2008, he was among the first group of overseas hires by CIC, where he was a founding member of both CIC's Private Equity Department and later the Special Investment Department for direct investing (head of CIC North America office 2014–2015). He had leadership roles in global investments involving financial services, technology (TMT), energy and mining sectors, including the setup of West Summit Capital, a cross-border growth capital fund in Silicon Valley – CIC's first overseas tech investment.

Prior to that, Ma served as the deputy head of equity capital markets at Barclays Capital, a vice president at JPMorgan investment banking, and a corporate lawyer at Davis Polk & Wardwell LLP.

A nationally certified Software Programmer as early as 1994, Ma is the author of the books *China's Mobile Economy* (2016), *Digital Economy 2.0* (2017 Chinese), *The Digital Silk Road* (2018

German), *China's AI Big Bang* (2019 Japanese), and *Investing in China* (2006). His new books are *The Hunt for Unicorns: How Sovereign Funds Are Reshaping Investment in the Digital Economy* (2020) and *The Digital War – How China's Tech Power Shapes the Future of AI, Blockchain, and Cyberspace* (2021).

Ma earned his MBA from the University of Michigan Ross Business School (Beta Gamma Sigma) and his Master of Law from the New York University School of Law (Hauser Global Scholar). He earned bachelor of science and bachelor of law degrees from Fudan University in Shanghai, China. He was selected a 2013 Young Global Leader at the World Economic Forum (WEF). In 2014 he received the NYU Distinguished Alumni Award.

## Ken Huang

Ken Huang is CEO of *DistributedApps* and chair of Blockchain Security Working Group for *Cloud Security Alliance* in the Great China Region (CSA GCR). Over the past 18 years, he has worked on application security, identity access management, cloud security, and blockchain for the fintech industry and health care industry. He is a certified CISSP (Certified Information Systems Security Professional) since 2007 and authored a *Blockchain Security Technical Guide*, published by China Machine Press in 2018.

As CEO of *DistributedApps*, he provides cybersecurity consulting services on blockchain and AI for startup companies globally. Prepandemic, he has been nominated to judge blockchain and AI startup contests organized by Google, Softbank, and Stanford University in 2018. As part of W3C Credentials Community Group Member, he provided his comments for NIST 800-63 documents on identity management.

As chair of *CSA GCR*, he has worked with top security experts in the blockchain space to create more than 10 white papers or technical guides on blockchain security. As a devoted member of Cloud Security Alliance, he was a reviewer of *Blockchains in*

*the Quantum Era* published February 2021. He was also the lead author of the Cloud Security Alliance document titled *Crypto-Asset Exchange Security Guidelines* published April 2021.

He is a blockchain advisor for Timeraiders.io, an NFT game project in the UK. He is also an advisor for KnownSec, a Hong Kong–based cybersecurity firm. In January 2021, he completed his Harvard Kennedy School Executive Program on Cybersecurity.

He has been invited to speak at numerous conferences globally covering blockchain, AI, and security, including Davos World Economic Forum, CoinDesk Consensus, IEEE, ACM, Worldbank, Stanford University, UC Berkeley, Bank of China, and Huawei. His speeches on layers of new technology and their convergence during Davos WEF 2020 were widely reported in many Chinese crypto media and used as original input in the first two chapters of this book.

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The authors can be reached on Linkedin for comments and feedback on *Blockchain and Web3: Building the Cryptocurrency, Privacy, and Security Foundations of the Metaverse.*

# Preface

For the vast majority of those watching the rapid rise of cryptocurrency (with blockchain), its emergence has been something of a curious novelty. The Russia–Ukraine war that started in February 2022 unexpectedly shines a spotlight on cryptocurrency, illustrating distract concepts like fast payment, decentralized network, and nonfungible token (NFT) in live, dramatic contexts.

In a March 2022 news article, Yahoo Finance noted that the Ukrainian government and nongovernmental organizations supporting the Ukrainian military effort have collectively raised $59.2 million from crypto donations. Alex Bornyakov, Ukraine's Deputy Minister of Digital Transformation, stated that crypto donations are crucial, especially due to the fast turnaround time: "In times like these, response time is crucial. Crypto is playing a role to give us flexibility to respond really quickly to deliver the army's required supplies." Crypto donations to Ukraine's government began to spike when Mykhalio Federov, Ukraine's vice prime minister, posted a Bitcoin and Ethereum wallet address via his Twitter, soliciting crypto donations worldwide (see **Figure 1**).

Crypto donations like Bitcoins and Ethereum tokens (including NFTs) have helped Ukrainians in a massive way by providing a source of monetary support in a secure fashion, from anywhere in the world to Ukrainians in urgent need. In March 2022, Ukraine government legalized the crypto sector as digital currency donations continue to pour in. It passed a law that creates a legal framework allow foreign and Ukrainian cryptocurrencies exchanges to operate legally. Banks will

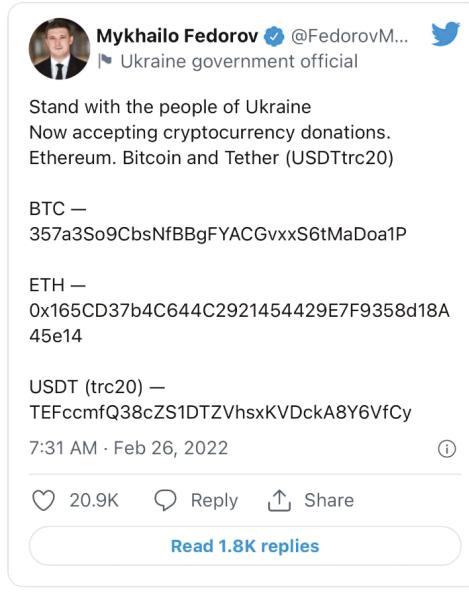


**Figure 1 Ukraine's Vice PM Tweeted Crypto Wallet Addresses for Donations**

be allowed to open accounts for crypto companies. Although Ukraine did not make any cryptocurrency legal tender, "virtual assets" becomes legal assets.

On crypto-based donations, Tom Robinson, blockchain analytics firm Elliptic's chief scientist, noted in a March 2022 CNBC article that cryptocurrencies also have the advantage of being suited toward international fundraising, due to their decentralized nature: "Cryptocurrency is particularly suited to international fundraising because it doesn't respect national boundaries and it's censorship-resistant – there is no central authority that can block transactions, for example, in response to sanctions."

"No central authority"? Maybe. After the war broke out, US Treasury Secretary Janet Yellen announced that the US would monitor cryptocurrencies as a channel (for Russia) to evade sanctions from the US and Western nations. The International Monetary Fund warned in a report that bitcoin could allow