

# SPECIAL REPORT

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## Demystifying DeFi: Digital Money and the Future of Decentralised Finance

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# Introduction: What is DeFi?

**T**he decentralised finance (DeFi) landscape encompasses a somewhat confusing hodgepodge of words and concepts. From digital assets (including cryptocurrency and specific ‘coins’ such as Bitcoin and Ethereum), to the technology underpinning this potential revolution (blockchain, distributed ledger, or even ‘unified’ ledger), and from aspects of tokenisation, including non-fungible tokens (better known as NFTs), to asset-backed stablecoins and the advent of central bank digital currencies (CBDCs), the digital finance landscape can be rather bewildering.

The perplexity of terminology aside, investors, executives, and policymakers from across jurisdictions regularly question the underlying investability of digital assets, and whether a digital asset can act as a store of value. Indeed, one of the most sophisticated investors has referred to Bitcoin as “rat poison squared”.<sup>1</sup> Meanwhile, some central banks have received kudos for pioneering

digital versions of their own sovereign currency, as such efforts might actually pave a foundation for greater financial inclusion and, hence, social advancement, as well as improving measures of taxation, both of which herald the potential for significant social advancements.

Just where do we stand in the DeFi universe? Recognising that we are currently amidst a ‘crypto winter’, will this eventually give way to a stablecoin spring? Looking beyond the crypto craze, the application of some aspects of distributed ledger technology and tokenisation has the potential to yield greater efficiencies within commercial and retail banking, and, importantly, for investment in private markets. In the case of the latter, such innovations—standing at the intersection of technology, financial services, and real assets—might herald opportunities for a democratisation of investing in private markets.

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Crucially, the viability and value of such innovations are pending the advent of widespread CBDCs, as investors and market participants require trust in the financial system, which is often predicated upon a fiat currency. As we shall explore, the premium placed on trust in the monetary system means that some of the more fruitful commercial opportunities for companies, asset managers, and investors might actually abound from the very jurisdictions in which central banks have successfully launched their own CBDCs. Brazil and India are notable examples here, as both countries have leap-frogged ahead of some other advanced economies in fostering sovereign-backed digital currencies. Additionally, jurisdictions in which central banks have created regulatory sandboxes, such as Singapore, have also been a propitious testing ground for fintech players writ large, and have also magnetised US and Japanese banks (amongst others) to explore the use of blockchain technology in cross-border transactions across Asian markets.<sup>2</sup>

Looking to commercial benefits, the faster transaction times resulting from such experiments have the potential to greatly reduce the cost of trade finance—a boon to cross-border corporations and financial institutions.<sup>3</sup> Singapore’s hosting of a digital finance ecosystem—involving diverse stakeholders to pilot innovation—represents a fusion of industry and regulation that constitutes a role model for other countries. And, with an eye on retail transactions and the potential for enhanced financial inclusion, new opportunities might abound within private markets. Pending the widespread adoption of CBDCs (and the corollary trust that the central bank can instil in digital currencies), the marriage of finance and technology might open up new vistas for home ownership, for smaller investors to access real estate investing, and for access to credit for entrepreneurs and for small businesses, which often make up the backbone of the employment base in many advanced and emerging economies alike.



# Money, Technology, and Innovation: A Potted History

**T**hroughout economic history and the world of money, waves of technological innovation have unlocked advancements in finance, with the potential to open up new vistas for trade, economic growth, and financial inclusion. As Eswar Prasad points out, the first implementation of paper currency—launched by the Chinese in the seventh century—replaced the cumbersome use of coins, thus enabling merchants to conduct trade over greater distances.<sup>4</sup> In the seventeenth century, widespread adoption of the printing press by the Dutch enabled the city of Amsterdam to maintain pole position as a global trading hub, and home to the first stock exchange, and one of the ‘ancestors’ of central banks.<sup>5</sup> Fast forward to the twentieth century, and the information and communication technology revolution yielded faster transaction times, which allowed for the rapid movement of goods, services, people, and capital across the globe, underpinning the rapid expansion of global trade and financial linkages.

The marriage between technology and money has a dark side as well. As swiftly as global capital flows can come into a country—ostensibly from rich-income countries seeking a return in emerging market and developing economies (EMDEs)<sup>6</sup>—it can also rapidly fly out, with the potential to upend local capital markets, perhaps resulting in a depreciated local currency and imported inflation. Also, looking at the application of technology to trading and credit creation, the amalgamation of computing to debt facilitated widespread securitisation of assets, which enabled countless investors to enter into potentially risky asset classes. The combination of faster transaction times with a myriad of seemingly liquid investments has also generated financial instability, as even in the non-banking world, credit crunches and ‘run on the bank’ scenarios have become a somewhat permanent feature of our financial system.<sup>7</sup> Clearly, in exploring the relationship between technology, money, and finance, too much innovation may not be a good thing.

# The Advent of Bitcoin, and How Crypto Lost its Cool

**B**itcoin, the original cryptocurrency, originated in 2008-2009 when an anonymous individual (alias Nakamoto) published an article on a “peer-to-peer electronic cash system”.<sup>8</sup> In 2009, the distributed ledger system (or blockchain) on which ‘mining’ bitcoins takes place was made available to the public.<sup>9</sup> This enabled holders of the encrypted currency to anonymously transact for goods and services without using a third party. Other cryptocurrencies soon proliferated—among them, ‘Ether’ (which traded on the Ethereum platform) allows for ‘initial coin offerings’ (or crypto-facilitated funding platforms for companies and start-ups).<sup>10</sup>

The argument has been made this proliferation of decentralised finance was made palatable for groups of people disaffected by the tumult of financial systems within advanced economies in the aftermath of the Global Financial Crisis (GFC).<sup>11,a</sup> Proponents of crypto have often conjured notions of a crypto ‘community’ and herald the dawn of a new era for finance ‘for the people’ beyond

‘illegitimate’ traditional banks and central banks. Crypto has also been invoked by populist leaders on the left and the right, touted by one leader as a currency with the potential to take “control back from central authorities”.<sup>12</sup>

## ‘Crypto Winter’

In considering the investability of crypto as a currency, it will need to stand the test of the traditional definition of money. Since the nineteenth century, money has been defined in three key ways: as a store of value, as a unit of account, and as a medium of exchange.<sup>b,13</sup> The prospects for crypto as a store of value have been repeatedly undermined by various crypto crashes over the last decade. At the onset of the most recent crypto ‘winter’<sup>14</sup> of 2022, crypto tumbled from its November 2021 peak and lost US\$1.8tn in value.<sup>15</sup> As a unit of account, challenges abound with

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a The argument has also been made that crypto’s ideological origins lie in libertarianism. See: David Golumbia, *The Politics of Bitcoin: Software as Right-Wing Extremism* (Minneapolis: University of Minnesota Press, 2016).

b See the discussion on William Stanley Jevons’s *Money and the Mechanism of Exchange* in Paul Sheard’s *The Power of Money* (pg. 3).

regard to financial integrity and consumer and investor protection.<sup>16</sup> As a medium of exchange, cryptocurrencies face significant regulatory headwinds, as many countries worldwide—including in sub-Saharan Africa, across West Asia, and within Asia—have banned the use of crypto outright.<sup>17</sup>

Moreover, looking beyond the traditional aspects of money and in considering the ‘political movement’ aspects of the crypto universe, the tight correlation between the performance of crypto and the US S&P and Nasdaq hardly spells the story of an alternative ‘safe haven’ from global financial markets.

**Figure 1: Bitcoin (BTC) correlation to Nasdaq (NDX) and S&P (SPX) (April 2020-April 2023)**



Source: CoinDesk<sup>18</sup>

Additionally, as the world confronts the impact of climate change, concerns have been raised regarding the heavy environmental footprint of some cryptocurrencies (particularly Ethereum).<sup>19</sup>

In considering the implicit relationship between trust and money in a well-functioning financial system, there is perhaps one additional factor that is underscoring the crypto winter. During the height of the COVID-19 pandemic and recovery in the US, the government—acting via the Small Business Association—channelled over US\$790 billion worth of loans to companies to weather the sudden economic stop.<sup>20</sup> As a result, small businesses reported keeping 89.1 million jobs,<sup>21</sup> which is more than half of the US labour force. The large American banks administered the lion's share of these funds. Notwithstanding some

initial confusion with the disbursement of the Pandemic Protection Program funds, the eventual staggering number—and jobs retained—might implicitly translate into a restoration of trust in the financial system, within the very segments where trust vanished in the wake of the GFC. Thus, in the case of the US market, crypto might have also partially lost its allure as the banks were significant actors in shoring up small businesses and the employment base during the COVID-19 crisis.<sup>c</sup>

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<sup>c</sup> Notwithstanding, humankind is in an era prone to financial bursts and bubbles; despite all its engineering, humankind has not eradicated the financial and business cycles. Thus, trust in certain financial institutions will likely ebb and flow in a cadence with financial cycles.



# Evolution of the Global Regulatory Landscape on Crypto

**T**he G20's recent agreement on a policy roadmap on governing crypto-assets evidences the extent to which the regulatory landscape is evolving and tackling the potential macroeconomic, financial stability, and financial integrity risks posed by crypto-assets. Responding to the request of the Indian G20 presidency, the International Monetary Fund and the Financial Stability Board have provided comprehensive policy recommendations for supervisory oversight and standard-setting in managing the potential risks associated with the complex and ever-changing crypto-asset ecosystem.<sup>22</sup> These

regulatory shifts—designed to mitigate the potential for macroeconomic and financial stability risks associated with crypto-assets—indicate a marked shift from many countries' outright bans on cryptocurrencies. As the regulation continues to evolve, one clear development underway is a concerted effort by many central banks and industry bodies to advance central bank digital currencies.



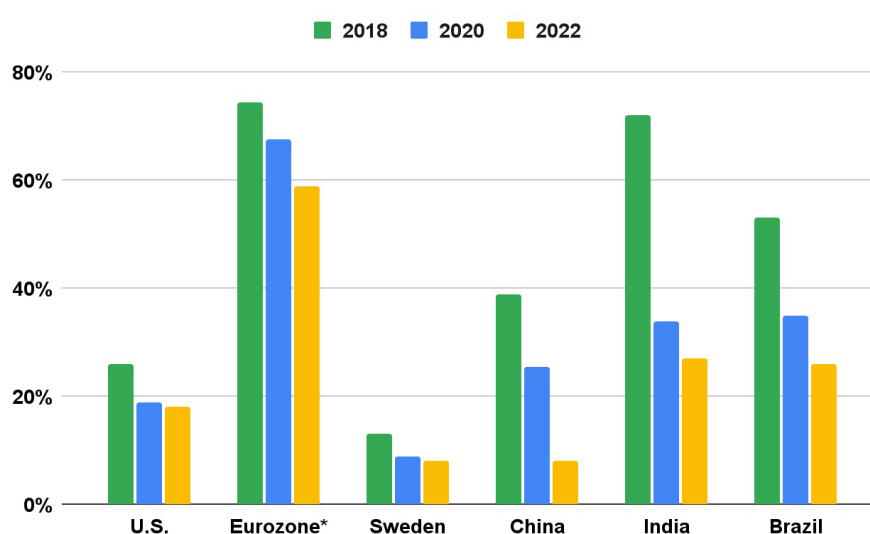


# Central Bank Digital Currencies in Scope

**L**ooking beyond the ‘coin’, the blockchain technology underpinning crypto might actually—as Prasad succinctly puts it—“herald the arrival of a more significant if less glitzy revolution”.<sup>23</sup> It must be pointed out that any advancements resulting from the application of distributed (or unified) ledger technology to financial services activity is dependent upon the development and proliferation of CBDCs. Again, in adopting the traditional view of money as a store of value, as a unit of account, and as a medium of exchange, the backing of a digital currency with a fiat currency—that is, decreed of value by a sovereign country<sup>24</sup>—is absolutely crucial.

So far, on a global basis, about 130 countries have either launched or experimented with launching their own CBDCs,<sup>25</sup> backed by the sovereign government. The latest efforts by central banks in part reflect a broader trend of a sharp reduction in cash transactions, or a ‘dematerialisation’ of money,<sup>26</sup> which accelerated during the pandemic.

**Figure 2: Share of total point-of-sale transactions in cash by geography (%)**



\* Eurozone data for 2018 and 2020 calculated assuming constant rate of change from 2016, 2019, and 2022 data provided  
Sources: Banco Central do Brasil, European Central Bank, The Federal Reserve, FIS, Statista, Sveriges Riksbank

As Figure 2 illustrates, for many advanced and EMDEs alike, the use of cash has rapidly dwindled since 2018. Sweden is a front-runner here, and the country’s e-krona was the world’s first digital currency.<sup>27</sup>

### **EMDEs in the Lead**

The use of cash has also rapidly dwindled in India<sup>d</sup> and Brazil, where the Reserve Bank of India and the Banco Central do Brasil launched their own CBDCs—the e-rupee and the Pix, respectively.<sup>28</sup>

<sup>d</sup> Cash-based transactions have also markedly declined in India since the demonetisation programme in 2016 and with the implementation of the Unified Payments Interface (UPI).

Accordingly, some of the largest banks in Brazil and India have also been able to rapidly adapt to the digital payment landscape, perhaps even innovating far beyond their counterparts operating within other advanced economies. Indeed, one North America-headquartered credit card company has teamed up with an Indian bank to collaborate with fintech companies in India, in support of the country's digital payment adoption.<sup>29,e</sup>

Notably, the launch of both the Pix in Brazil and the e-rupee in India have been critical driving forces behind stepping up levels of financial inclusion within domestic societies. The use of UPI to support households during the twinned health and economic crises resulting from the pandemic helped to channel money swiftly where it was needed most (in contrast with some of the confusion surrounding the stimulus checks in the US). Additionally, in the case of India, the 'JAM trinity'—Jan-Dhan (basic accounts), Aadhaar (unique identification system), and mobile technology—has further supported the channelling of government funds to those in need.<sup>30</sup> The case can be made that with the advent of CBDCs, improvements in taxation collection might also abound, rendering a more just and

fair economic system.<sup>31</sup> Additionally, as some EMDEs launch CBDCs, further opportunities exist for financial inclusion by reducing the cost of remittances. Sending cross-border wire transfers can be extremely costly and inefficient, and a network of CBDCs might help to reduce these transaction costs.

### **Advanced Economies on the Leap**

Several advanced economies have also recently experimented with cross-border trading and settlements in their own CBDCs. With the support of the Bank for International Settlements (BIS), the central banks of France, Singapore, and Switzerland have successfully traded in wholesale digital versions of euros, francs, and Singaporean dollars.<sup>32</sup> This launch comes off the back of collaboration among several central banks on experimenting with CBDCs and tokenisation within BIS' Innovation Hub.<sup>33</sup> Tokenisation is the process of representing actual assets with digital

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e Meanwhile, in the US, House Republicans have introduced legislation with an eye on banning the development of a CBDC (a 'digital dollar'). For more, see <https://www.technologyreview.com/2023/07/21/1076645/is-the-digital-dollar-dead/>; <https://www.washingtonexaminer.com/policy/economy/house-republicans-advance-bill-block-central-bank-digital-currency> .

tokens on a programmable ledger, or blockchain. When used in wholesale transactions between banks, tokenisation has the potential to rapidly improve asset ownership, asset transfer,<sup>34</sup> and aspects of ‘KYC’ (know your customer). Crucially, when backed by a fiat currency, or CBDC, such transactions can be conducted upon a ‘foundation of trust’, which, in turn, helps pave a path for commercial and investment banks to play a significant role.

### **Commercial Opportunities Abound: Singapore in the Limelight, Japan in the Wings**

Singapore’s participation in a successful test of cross-border trading of CBDCs should come as no surprise to DeFi watchers.<sup>35</sup> The city-state has fostered a ‘regulatory sandbox’: to jump-start innovation in the technology underpinning digitisation and finance—while also protecting end users and safeguarding financial stability—policymakers have created a dynamic ecosystem with a multistakeholder approach, attracting players from across the fintech landscape. This ‘sandbox’ has magnetised the participation of some of the world’s largest banks, including American and Japanese commercial banks.<sup>36,37</sup> In an analogous model to some private markets and infrastructure investing across Asia, some banks

have built upon the successes of pilots in the digital payments space in Singapore, and then launched such experiments in India.<sup>38</sup>

The application of digital payments—and the trust cemented by CBDCs—has the potential to significantly reduce the cost of trade finance. In servicing clients across the globe and Japanese companies which profit from outbound activity, Japanese banks are also building stablecoin platforms to be able to reduce trade finance costs. It has been conceded that a CBDC from the Bank of Japan will likely be a few years away, after the recent launch of a pilot programme for a digital yen.<sup>39</sup> Looking across the CBDC landscape, the uptake of some digital currencies, such as the e-rupee, remains modest (at the time of writing) for both retail and wholesale transactions.<sup>40</sup> With an eye on the implicit role of trust in the monetary system, it will likely take time for central banks to effectively communicate to end users the benefits of using CBDCs. On the retail side, this includes charting out the means by which enhanced social inclusion can be achieved; on the commercial side, the proliferation of successful pilots such as Project Marina (shepherded by the BIS) will also be helpful.



# Levelling up for Private Markets

**A**midst the backdrop of a widespread uptake in CBDCs (with several EMDEs in the lead, including Brazil and India), as several advanced economies take a leap (notably, Singapore and, latterly, Japan), and as commercial banks work in tandem with central banks on experimenting within the bounds of a safeguarded regulatory framework, opportunities also abound for the application of DeFi to private markets. Once the level of trust is eventually cemented, as central banks shepherd the digital finance market, investors and executives might, in turn, feel emboldened to apply some of the benefits of blockchain technology to asset ownership. In real estate, distributed ledger technology has the potential to significantly reduce transaction costs, improvise KYC, and streamline a cumbersome process of asset transfer, deeds, and titling<sup>41</sup> (perhaps also technologically automating a swathe of clerical services jobs).

Additionally, the use of big data—already piloted by several fintech disruptors—has the potential to increase the availability of credit to borrowers, which might not fit the classical profile template of traditional lenders.<sup>42</sup> This is especially important as access to credit is often a first step for building wealth, especially pertinent for prospective first-time homeowners, who are likely to counter a continuing crisis of affordability in housing in markets across the globe. Moreover, in an elevated interest rate environment, access to credit and start-up capital for small business owners and entrepreneurs can be a scarce commodity. While the advent of crypto-assets has opened up opportunities for crowdfunding of such ventures,<sup>43</sup> the fate of such capital might be associated with the boom and bust of crypto. By contrast, should such capital raising efforts be underpinned by the trust associated with a central bank and (and widespread CBDC issuance), small businesses might have a more durable and dependable form of alternative financing—capital which might again be out of reach from traditional lenders.

Also, with an eye on reducing wealth and income inequality, the application of financial technology to real estate investing has opened up a new vista for smaller investors to enter the single-family rental landscape in the US (as the allocation to such assets might be deemed to be a hassle, out of reach, or both).<sup>44</sup> Looking beyond the US and to EMDEs, the application of tokenisation to aspects of the real estate industry (underpinned by CBDCs) might also open up new opportunities for smaller retail investors to begin to build wealth and income by acquiring fractions of properties.<sup>45</sup> Given trends of an increase in

housing formation (in both advanced and EMDEs alike) and deepening socioeconomic inequalities, the ability for first-time or smaller investors to participate in the property ladder via tokenisation has the potential to help bridge social divides in a manner beyond traditional pools of finance.

“In real estate, distributed ledger technology has the potential to significantly reduce transaction costs, improvise KYC, and streamline a cumbersome process of asset transfer, deeds, and titling (perhaps also technologically automating a swathe of clerical services jobs).”




# Conclusion

**S**urveying the entire DeFi landscape and disentangling some rather confounding concepts, it is evident that the technology underpinning cryptocurrencies has far wider applicability and value than the original digital assets themselves. In considering the traditional definition of money—as a store of value, as a unit of account, and as a medium of exchange—crypto is unlikely to stand the test of time without the backing of a fiat currency, and the trust that goes along with it. In looking to the ‘political movement’ aspects of crypto, its strong correlation with the S&P and the Nasdaq has also dented the allure of the ‘rebel finance’ aspects of the crypto landscape. Moreover, in the case of the US, we might say that an element of trust has been restored in financial institutions, especially in light of the disbursement of nearly US\$1 trillion worth of loans to small businesses during the pandemic.

As central banks across the globe pioneer their own CBDCs, investors and executives can be poised for opportunities for improvements in wholesale banking, trade finance, and real asset investing. This backing of a fiat currency is an absolutely essential component of trust within the digitising monetary system; additionally, the active participation of regulators and industry bodies to support innovation within a regulatory sandbox remains critical. As the central banks from some economies are laggards in advancing their own CBDCs, frontrunners such as India and Brazil have paved a firm foundation for local banks to take advantage of digital versions of their own sovereign currencies. As the main gateway city to Asia, Singapore continues to magnetise the participation of foreign banks and non-banks to access its digital finance landscape, which can then act as a launchpad for commercial banks to pilot similar innovations in India.

As CBDCs become more widespread and layers of trust in digitising—and even tokenising—the monetary system are instilled, opportunities for greater efficiencies in private markets (and thus enhanced inclusion for segments of the population) are likely to unfold. Such innovations are likely to benefit institutional investors allocating capital to the real asset landscape, retail investors in real estate, and homebuyers who are likely to continue to face an affordability

crisis across many global markets over the long duration. Such efficiency gains have the power to play a positive feedback loop back into economic growth by making societies more productive and potentially reducing wealth inequalities, which are deepening amidst increasingly services-oriented activity in both advanced economies and EMDEs alike. 



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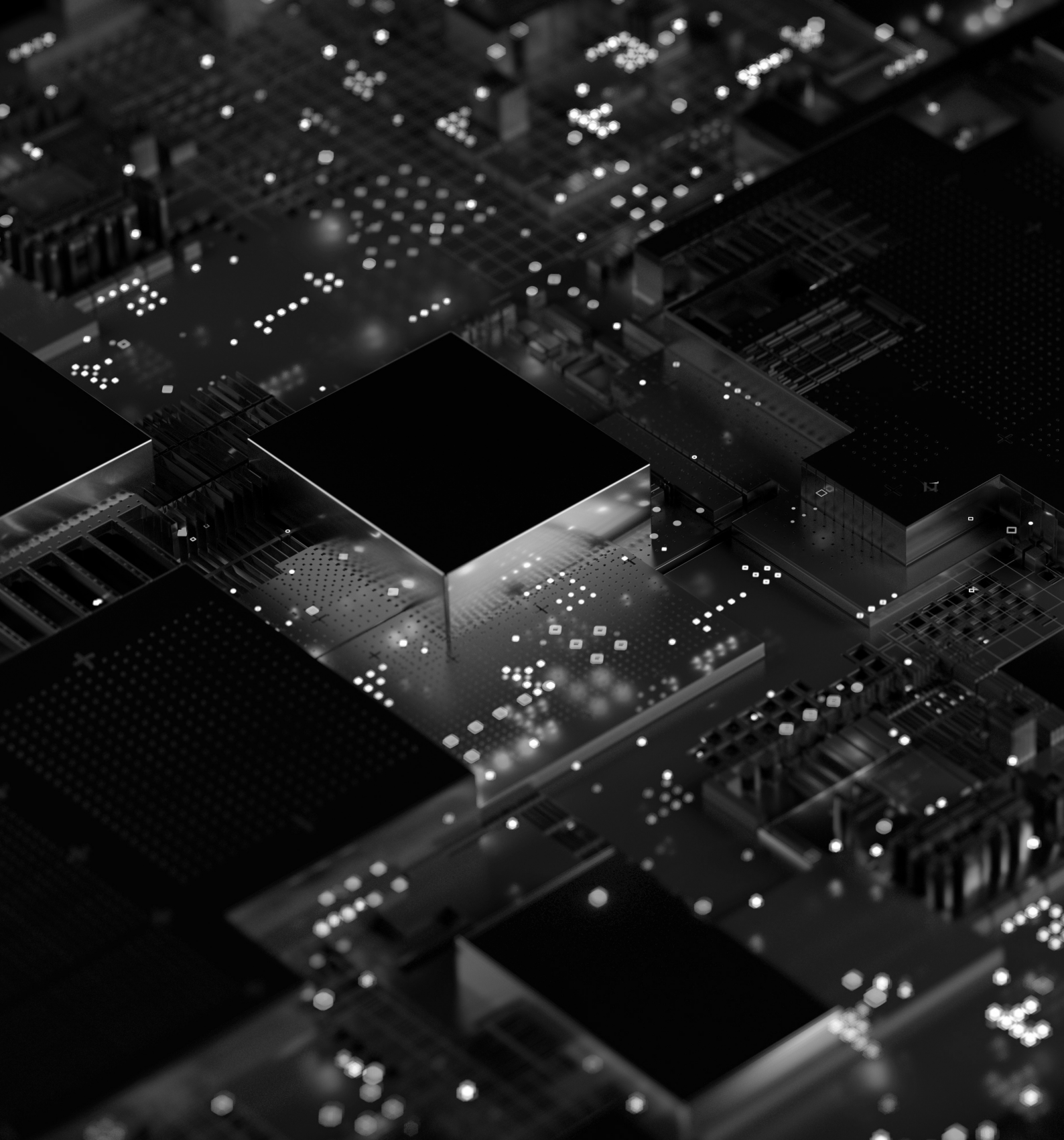
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## **About the Author**

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