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Emerging Digital Finance Ecosystem and Positive Use Cases

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INTRODUCTION

This second brief from the Digital Finance Project Team (DFPT) examines the potential positive use cases in which the crypto and blockchain ecosystem could benefit consumers, businesses, and financial intermediaries. There is considerable potential for improvement, because the current financial system is complex and inefficient, relying on a complex web of financial intermediaries utilizing inflexible legacy technologies. The three positive use cases that are particularly relevant to financial services are:

1. Easier digital identity verification and data privacy:

High compliance costs incurred by financial institutions - namely, complex internal operating systems and processes - prevent them from meeting Know Your Customer (KYC) and Anti-Money Laundering (AML) requirements.

2. Low-cost, timely, secure, and scalable payments:

The current payments regime could be improved from a cost, speed, safety, and transparency standpoint.

3. More inclusive and efficient financial services

through decentralized finance (DeFi): DeFi could improve access to financial services for the unbanked and underbanked; broaden investment opportunities through fractional ownership; increase the efficiency of capital markets activities, as by reducing the high costs of record keeping; and improve the efficiency and resilience of the operational infrastructure of financial intermediaries.

These use cases provide practical examples of how digital finance has the potential to transform the financial services industry in a positive way. They also force incumbents to rethink and reconfigure their operating models - thus improving their services, showing the potential of digital finance in positively transforming the financial services industry. This underscores the need for lawmakers and regulators to protect consumers, investors, and the overall financial system through guardrails that can support, rather than stifle, economic transformation.

The potential for progress is illustrated by the sharp increase in the overall cost of the financial system.

For example, US financial intermediation activities represent 8.5 percent of GDP, more than double the level of 1950.¹ While part of this rise undoubtedly stems from the provision of new services that enable better management of financial risk, it is also likely due to the increasing complexity of the financial system and the high cost of regulatory compliance.² For example, building up Bank Secrecy Act (BSA) and AML capabilities has been a regulatory imperative, but doing so has been very costly. Similarly, the legacy technology infrastructure provides low interoperability and is costly to maintain and update. The core focus of the use cases below is the distinguishing features of the new underlying technologies and how they have the potential to reduce certain operational risks while increasing efficiency.

The Positive Use Cases

Use Case 1: Easier Digital Identity Verification and Data Privacy

High cost of KYC and AML requirements: As part of BSA/AML legislation, banks have rigid KYC requirements. The cost of failure is substantial, and large fines have been imposed by US federal and state banking regulators and the US Department of Justice for noncompliance and other shortcomings. For example, HSBC was fined \$1.6 billion in 2012, BNP Paribas was fined \$8.9 billion in 2014, and Westpac was fined \$900 million in 2019. Furthermore, the cost of operating a compliant BSA/AML regime is high. Although estimates of this cost vary, a 2016 global survey of 772 financial institutions found that annual KYC costs averaged \$60 million per firm.³ Ultimately, this cost is passed on to businesses and consumers.

As proven by the recent imposition of severe economic sanctions on Russia, BSA/AML has become even more important, as banks have taken on the additional re-

sponsibility of identifying bad actors and sanctioned individuals across a variety of products. However, the complexity of legacy systems and operating models makes it difficult for banks to do this efficiently. In addition, privacy laws restrict the ability of governments and banks to share information that identifies sanctioned individuals.

Implementing automated KYC, digital identity, and verifiable credentials through blockchain technology could lower costs while ensuring compliance with privacy laws and AML. The goal would be to use the broader crypto ecosystem, including the permanent record on the blockchain, to enable businesses and consumers to create a secure, private, auditable, digital identity that could be relied upon for KYC and AML purposes. Consumers could verify their information with a financial institution without the cost and time of exposing personally identifiable information (PII). The primary benefit would be to allow the financial system to serve clients timelier and more efficiently while maintaining compliance with privacy and AML standards.

Improving the KYC process through blockchain technology would benefit both banks and consumers by identifying customers and beneficial owners in a more straightforward and lower-cost manner while protecting consumer data.

The World Wide Web Consortium (W3C) is working on standards for decentralized identity solutions such as verifiable credentials (i.e., a tamper-evident credential having authorship that can be cryptographically verified). A verifiable credential could be used to represent information found in physical credentials, such as a passport or license, as well as for concepts that have no physical equivalent, such as ownership of a bank account.

In today's financial system, it is unlikely that a large banking institution would be willing to accept such a verifiable credential from a consumer, as the potential risk of liability would be too high. However, one can imagine a world where a group of centralized institutions agree to accept a version of a verifiable credential that a consumer shares with them from a non-custodial wallet (where individuals control their data). If consumers opt to share the information that they own with a bank, it would be done so in a privacy-enabled way through zero-knowledge proofs, mitigating the core challenge of maintaining privacy of consumers or corporations while still allowing an efficient method for determining identity. Zero knowledge proofs provide a way for two parties to prove that a given statement is true or data are valid without having to share any of the data specifics between the two. Current beta tests allow banks to prevent criminal activity through encrypted data sharing without revealing private information to other institutions. There are also initiatives for developing tiered identity verification based on transaction amounts and for issuing digital identity⁴ in government regimes that don't have formal, universal identity management systems.

Use Case 2: Low-Cost, Timely, Secure, and Scalable Payments

While there have been important payment innovations in recent decades, today's payments regime still involves significant costs, security and fraud risks, and slow transfer and final settlement of funds. These frictions have ripple effects across the entire payments value chain—affecting governments, financial institutions, consumers, and businesses.

Existing wholesale clearing and settlement systems lead

to inefficiencies and delays in participants' ability to discharge their payment and settlement obligations. This can threaten both funding and market liquidity, which, in turn, can increase the risk of large systemic failures. For example, cross-border payments can take several days to complete, incur high fees, and involve multiple parties and jurisdictions that create friction and foreign exchange risk. From the perspective of a commercial bank, the slow service speed also ties up liquidity. Costly manual interventions are required for consumers and commercial banks to navigate across different systems and operational platforms, and settlement delays increase systemic risk and reduce transparency.

From the perspective of consumers, faster, lower-cost remittances are needed to increase inclusion and access to the financial system. A key area of focus should be the cross-border remittances of migrant workers and financially vulnerable populations, which account for a significant share of cross-border activity. The World Bank estimates the average percentage transaction fee for cross-border remittances to be 6.04 percent,⁵ with the fee even higher for transactions executed through banks. Underscoring the potential for significant improvements in efficiency, the G20 pledged to reduce the cost of remittances to less than 3 percent and to eliminate remittance corridors (the sum of remittances between two specific countries) with costs higher than 5 percent by 2030.⁶

There is also significant potential for improvement in international corporate transactions. Global corporations move nearly \$23.5 trillion between countries annually, equivalent to about 25 percent of global GDP. To do this, they must rely on wholesale cross-border payment processes that remain suboptimal in terms of cost, speed, and transparency.

1 Mitra Toossi, "A Century of Change: The U.S. Labor Force, 1950–2050," Bureau of Labor Statistics, May 2002, <https://www.bls.gov/opub/mlr/2002/05/art2full.pdf>.

2 Thomas Philippon, "Finance, Productivity, and Distribution," Brookings, October 2016, <https://www.brookings.edu/wp-content/uploads/2018/01/philippon-october-2016.pdf>.

3 "The Cost of Compliance for Banks: Preparing for FinCEN's Customer Due Diligence Rule," Thomson Reuters, accessed May 24, 2022, <https://legal.thomsonreuters.com/en/insights/articles/cost-of-compliance-for-banks-with-new-cdd-rule>.

4 The Government of Sierra Leone launched Africa's first digital identity platform with UNDP, UNCDF, and Kiva to enable financial sector access nationally. Matthew Davie, "Kiva's Next Frontier: Kiva Protocol," Kiva.org, accessed May 24, 2022, <https://www.kiva.org/blog/kivas-next-frontier-kiva-protocol>.

5 As of Q4 2021. "Remittance Prices Worldwide: Making Markets More Transparent," May 5, 2022, <https://remittanceprices.worldbank.org/>.

6 "Sustainable Development Goal Indicators," United Nations, <https://unstats.un.org/sdgs/>.

In addition to incurring transaction costs of more than \$120 billion per annum (excluding foreign exchange transaction costs), these processes entail hidden costs arising from trapped liquidity and delayed settlement.

In the near term, any improvements will need to incorporate the roles and responsibilities of central banks and commercial banks, because that is how liquidity of the global financial system is currently provisioned. Nevertheless, one study that examined the potential of a multiple central bank digital currency (mCBDC) network to tackle these problem estimated that a full-scale, new settlement network that facilitated 24/7 real-time, cross-border payments and foreign exchange payment versus payment (FX PvP) settlements could save multinational corporations nearly \$100 billion annually.⁷ This payment network would ideally be constructed from an mCBDC network, but similar benefits would be available even if the network were constructed and operated by private sector participants.

The challenge is enabling interoperability with existing systems, platforms, and financial standards (e.g., SWIFT, NACHA, and ISO 20022). Any new payments network will challenge the traditional correspondent banking system but also will likely provide opportunities for the present participants—commercial banks, payment operators, market-makers, and liquidity providers—to add new capabilities and utilize new technologies and other third-party service providers.

Other potential improvements to the payments system include faster database processing to settle the increasing volume and complexity of commands. For example, FedNow promises greater throughput capacity by making improvements to Fedwire. But because FedNow

will rely on legacy technologies, it manages to increase the throughput of just one database. Multicurrency network providers should examine how throughput can be increased through multi-database platforms. The goal should be to enable large and small transactions to be facilitated for consumers and commercial banks across borders and at all times (i.e., 24/7, near-instantaneous, offline included).

Use Case 3: More Inclusive and Efficient Financial Services Through DeFi

DeFi businesses using blockchain technology have the potential to improve efficiency, reduce intermediation layers, and improve the access and availability of financial services. We highlight several areas where such innovation could be transformational.

- **Democratization of financial services to include underbanked small businesses and individuals:** The \$5.4 trillion global trade finance ecosystem accounts for 6 percent of global GDP and is dominated by small and medium enterprises (SMEs).⁸ These serve as the backbone of the global trade economy, accounting for 95 percent of the firms and 60–70 percent of employment,⁹ but they are faced with significant obstacles related to financing. There is significant unmet trade finance demand, estimated to be \$1.7 trillion,¹⁰ along with high rejection rates from banks due to elevated credit and fraud risks. There is added operational complexity stemming from due diligence requirements and the need to navigate the regulatory differences across jurisdictions. Digitization of trade processes and trade finance utilizing blockchain could increase transparency and efficiency.

Early-stage digital platforms such as Marco Polo Network (a consortium of approximately 45 banks) and we.trade by IBM (with 15 banks in Europe) are leveraging blockchain solutions to provide real-time visibility into facilitated trades, payments, and working capital financing.

For individuals, blockchain technology could potentially increase access to low-cost financial services. World Bank research¹¹ estimates that one-third of the global population, or about 1.7 billion people, are unbanked. Adoption rates are likely to be higher in emerging markets, where more people remain underserved due to the high cost of customer acquisition for traditional financial institutions.¹² Accenture has estimated that serving previously unprofitable individuals and small businesses could generate up to \$380 billion in revenues,¹³ which indicates the opportunity for development of scalable solutions.

- **Democratization of access to investing through tokenization of assets,** especially in private markets: The World Economic Forum estimates that up to 10 percent of global GDP will be stored and transacted via blockchain by 2027, and tokenized markets could potentially be worth as much as \$24 trillion by that year.¹⁴ Private markets would likely precede public markets in tokenization due to the greater barriers to access relative to size and value—private markets exceed their public equivalents by a factor of 2.5 in debt, 4.5 in equity and more than 30 in real estate.¹⁵ Through tokenization of illiquid private market assets in particular, limitations

on fractional ownership could be eliminated, and this could facilitate participation by a broader investor base, including retail investors who cannot access these markets due to high investment minimums. Fractionalization of new asset classes could also expand the range of available and acceptable collateral beyond traditional assets to include private markets.

In addition, operational efficiency gains through smart contracts could further facilitate access by reducing inefficiencies and manual processes in private investment issuance, trading, and management. A blockchain approach could provide an independent and automated source of truth for investor and issuer identities that are currently managed and verified by intermediaries, reducing counterparty risk. Finally, if private investments were put on a blockchain, then the operational transition to public markets would potentially become much smoother.

- **Efficiency gains in capital markets through faster settlement, improved clearing and custody:** The financial services industry spends an estimated \$133 billion per year on post-trade securities clearing and settlement.¹⁶ Despite these expenditures, there are still significant losses: a global trade settlement failure rate of just 2 percent is estimated to result in costs of up to \$3 billion,¹⁷ notwithstanding new cash penalties being imposed by regulators such as the Settlement Discipline Regime in the EU. The rate of settlement fails has gone up recently, driven by market volatility and higher trading volumes.

7 Jason Ekberg, Tek Yew Chia, Michael Ho, and Laura Liu, “Unlocking \$120 Billion Value in Cross-Border Payments: How Banks Can Leverage Central Bank Digital Currencies,” Oliver Wyman, November 3, 2021, <https://www.oliverwyman.com/our-expertise/insights/2021/nov/unlocking-120-billion-value-in-cross-border-payments.html>.
8 Alessio Botta, Adolfo Tunon, Reema Jain, Pamela Mar, and Andrew Wilson, “Reconceiving the Global Trade Finance Ecosystem,” McKinsey & Company, November 17, 2021, <https://www.mckinsey.com/industries/financial-services/our-insights/reconceiving-the-global-trade-finance-ecosystem>.
9 “Small and medium-sized enterprises,” National Action Plans on Business and Human Rights, <https://globalnaps.org>.
10 Kijin Kim, Steven Beck, Ma. Concepcion Latoja, and Mara Claire Tayag, “2021 trade finance gaps, growth, and jobs survey,” ADB Briefs, Number 192, October 2021, <https://www.adb.org/publications/2021-trade-finance-gaps-growth-jobs-survey>.

11 World Bank Global Findex Database 2017, World Bank, 2018, <https://globalfindex.worldbank.org/>.
12 Marina Niforos, “Blockchain in Development—Part II: How It Can Impact Emerging Markets,” EM Compass Note 41, International Finance Corporation, July 2017, <https://www.ifc.org/wps/wcm/connect/d08ac913-83b8-4426-9bbb-d465be0d4eda/EMCompass+Note+41+-Blockchain+Part+II.pdf?MOD=AJPERES&CVID=IS54cTB>.
13 Accenture, “Banks Have a \$380 Billion Market Opportunity in Financial Inclusion, Accenture and CARE International UK Study Find,” Accenture Newsroom, November 11, 2015, <https://newsroom.accenture.com/news/banks-have-a-380-billion-market-opportunity-in-financial-inclusion-accenture-and-care-international-uk-study-find.htm>; Gerry Boyle, S. Whitehouse, L. James, and F. Erik Kolnes, “Within Reach: How Banks in Emerging Economies Can Grow Profitably by Being More Inclusive,” CARE and Accenture, January 1, 2015.
14 World Economic Forum, “Deep Shift: Technology Tipping Points and Societal Impact,” September 2015, http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf.
15 Thomas Olsen, John Fildes, and Karl Gridl, “For Digital Assets, Private Markets Offer the Greatest Opportunities,” Bain & Company, December 16, 2020, <https://www.bain.com/insights/for-digital-assets-private-markets-offer-the-greatest-opportunities/>.
16 Matt Long, Laurie McGraw, Nicole Bodack, Soichiro Muto, Nicholas Tilson, and Schira Lillis, “Towards the Capital Markets of Tomorrow,” Accenture, June 2, 2021, <https://www.accenture.com/us-en/insights/capital-markets/capital-markets-vision-2025>.
17 Depository Trust & Clearing Corporation (DTCC), “A Roadmap to Automation: How an SSI Utility Benefits All Participants,” April 2019, <https://www.dtcc.com/news/2019/april/17/dtcc-outlines-path-to-reduce-trade-failures-increase-security-and-efficiency-of-markets>.

According to the European Securities and Markets Authority, equity settlement fails hit a high of 14 percent in March 2020 and remain elevated compared to pre-pandemic levels of 2–4 percent for bond markets and 5–10 percent for equity markets.¹⁸ In addition to tangible costs, settlement fails can have knock-on effects by exposing trading counterparties to credit and liquidity risks. Seventy percent of settlement fails occurred due to the inability of sellers to deliver securities on time because of inventory management or data quality issues.¹⁹

Blockchain technology can allow for faster settlement, with transactions occurring in minutes, over 24/7/365-day markets, versus traditional settlement cycles that tend to be long and at fixed time intervals (T+2 or 3 days), which creates counterparty risk and less efficient liquidity management. The key innovations are a shared database of securities ownership that can be updated without relying on specialized intermediaries and the use of smart contracts to mitigate settlement risk. Bond issuers could save up to 35 percent of issuance costs,²⁰ and green bond issuers could save as much as 90 percent²¹ through a streamlined process of tracking use of proceeds.

In addition, using digital ledgers to improve the efficiency of numerous administrative processes for issuers, such as profit sharing, voting-rights distribution, and buybacks, could reduce reconciliation costs in securities trading. As market participants become more comfortable with a blockchain-based digital ledger as the “golden copy” of data, reconciliation and record keeping could be done more efficiently.

Conclusion

The traditional financial system has significant shortcomings and inefficiencies, including high operational costs, low transparency, and poor interoperability. The existing operating model—built on manual processes, multiple intermediaries, and an operational infrastructure that has not kept pace with technological advancements—cannot be sustained.

Blockchain-based technology has the potential to provide solutions in several important ways. These include enabling easier digital identity and data privacy, scalability of payments, and more inclusive, lower-cost access to financial services.

Blending traditional and crypto business models and strategies may be the best way to lay a new foundation for our financial system. For businesses, developing better interoperability among existing and future platforms should be a prime focus for each of the use cases discussed in this brief.

As outlined in the DFPT’s introductory brief, policymakers and regulators can play a constructive role in supporting business efforts to develop more inclusive and efficient business models enabled by technology while ensuring that appropriate governance, risk management, and investor and consumer protection requirements are implemented to safeguard consumers, businesses, and the broader financial system.



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¹⁸ “ESMA Report on Trends, Risks and Vulnerabilities”, European Securities and Markets Authority, September 2020, https://www.esma.europa.eu/sites/default/files/library/esma_50-165-1287_report_on_trends_risks_and_vulnerabilities_no.2_2020.pdf.

¹⁹ Alexander Westphal, “Optimising Settlement Efficiency: A European Repo & Collateral Council Discussion Paper”, International Capital Market Association, February 2022, <https://www.icmagroup.org/assets/Uploads/ERCC-discussion-paper-on-settlement-efficiency.pdf?vid=2>.

²⁰ Tommy Stubbington, “Banks Turn to Blockchains to Reform Costly Bond Market,” Financial Times, June 30, 2021, <https://www.ft.com/content/8b1005ed-5d70-4a31-b577-6c7f1f507c60>.

²¹ “HSBC Green Bonds Report,” HSBC, October 2019, <https://www.hsbc.com/-/files/hsbc/investors/fixed-income-investors/green-and-sustainability-bonds/pdfs/191001-hsbc-green-bonds-report-2019.pdf>.

