Foreword

Bitcoin, blockchain, and the capabilities of the distributed ledger were first introduced to the market 13 years ago through the Bitcoin Whitepaper--the virtual currency's 3,550-word foundational document that is 1,000 words shorter than another foundational document, the U.S. Constitution, ex amendments. Both documents established a framework for a new form of governance. The simplicity of Bitcoin's concept and brevity of the foundational document are not commensurate with the complexity of the ecosystem, magnitude of market innovation, and scale of new opportunities and potential disruption that is now emerging. Although it is still early days in the digitalization of markets, the pace of crypto adoption already outpaces the adoption rate of the internet in the 1990s and portends more change to come.

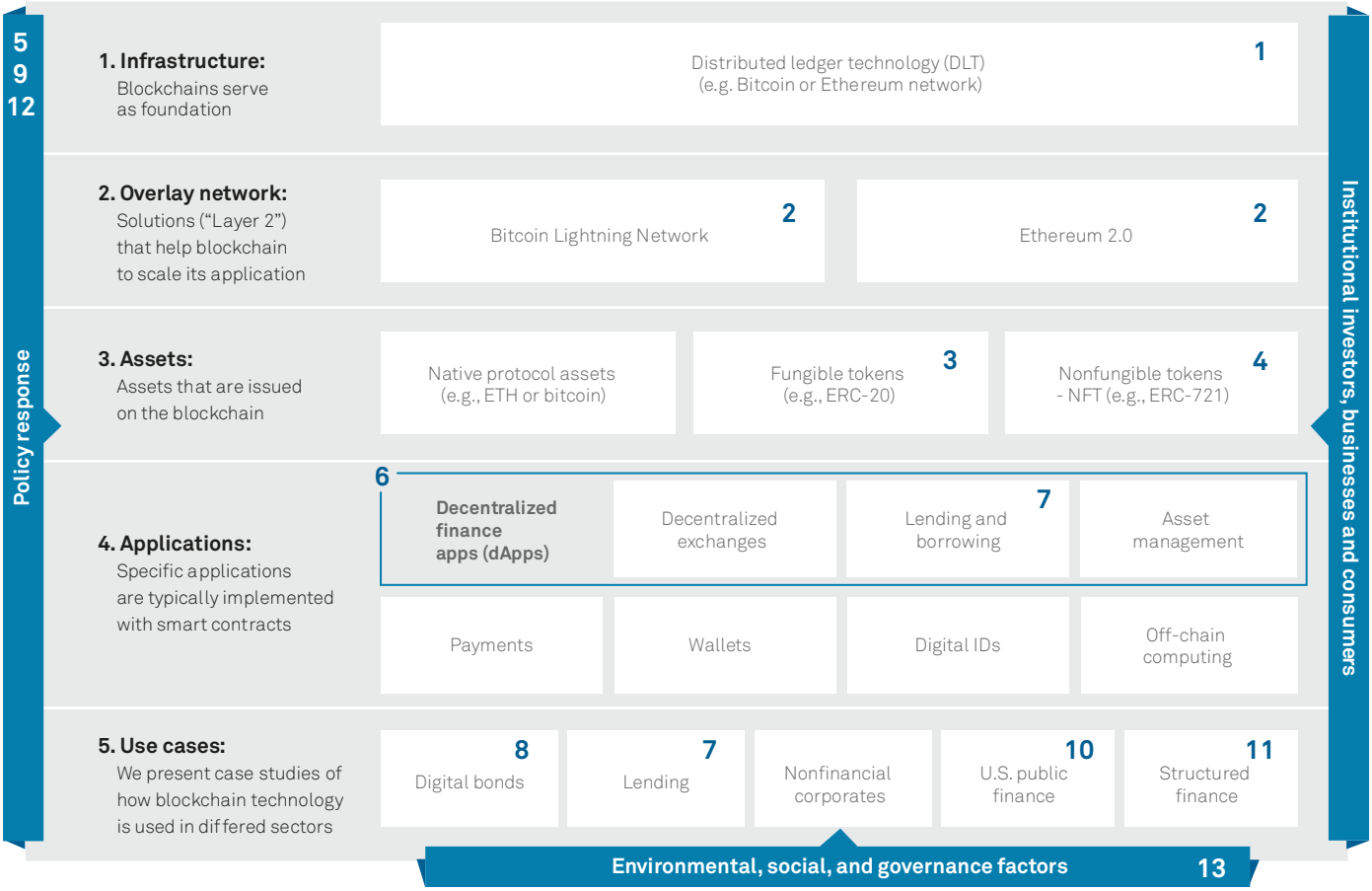
Bitcoin initially captured the imagination of retail investors but is now grabbing the attention of institutional investors and policymakers throughout the world. This is because, while bitcoin provided a foundation for cryptocurrencies and the current incarnation of blockchain, the digitalization of markets now extends well beyond the more narrow confines and use cases of bitcoin.

As is often the case with emerging technologies, the full scale and scope of the market impact--driven by blockchain, cryptography, and smart contracts--is difficult to understand and even more difficult to accurately predict. Cryptocurrencies and the broader ecosystem remain a small segment of the financial market. For instance, as of Sept. 7, 2021, the total market capitalization of cryptocurrencies stood at around $2.2 trillion--about 5% of the U.S. equity market capitalization. But broader institutional investor acceptance may herald a new phase of rapid acceleration.

This digital ecosystem includes new organizations, which provide new services, new products, new forms of risk and performance analytics, new job functions, and ultimately a new set of terms and language that are integral to it. The response to this developing ecosystem is very polarized, not helped by the technical and fast-moving nature of the underpinning technologies. Learning what staking is, or how a flash loan or liquidity pool works, or the difference between a hard fork versus a soft fork, or proof of work versus proof of stake, can be demanding and often confusing.

In this initial report, we strive to provide a high-level framework for understanding the evolving digital landscape and ecosystem, including catalysts and obstacles for its advancement and credit implications. We present a compilation of short reports on various key aspects of the digitalization of markets, including the technology that powers digitalization, the global regulatory and policy landscape, the decentralized finance (DeFi) ecosystem, tokenization, altcoins, and non-fungible tokens (NFTs), to name a few. For each topic we provide an overview of the subject, the operating landscape, and the key credit implications. As a result, the report is largely tailored to readers in the earlier stages of their digital journey. In addition, while this report focuses on the financial market impact and infrastructure, we acknowledge that the use cases and wider effects of the technology powering digitalization go well beyond these confines.

The Digitalization Of Markets--A Simplified Thematic Map



Note: numbers in graphic refer to writeup in the table of contents. Source: S&P Global Ratings.

Why The Fuss?

At its root, market digitalization is powered by technology capabilities that can both complement and disrupt established market frameworks and business models through the formation of a digital ecosystem and a new set of operating rails. These new rails are:

- Decentralized, enabling peer-to-peer transactions that reduce or eliminate the need for traditional intermediaries;
- Immutable and fully transparent for each transaction; and
- Permissionless, borderless, and censorship-resistant, giving users access from anywhere at any time, with complete freedom to interact with any other user of the technology.

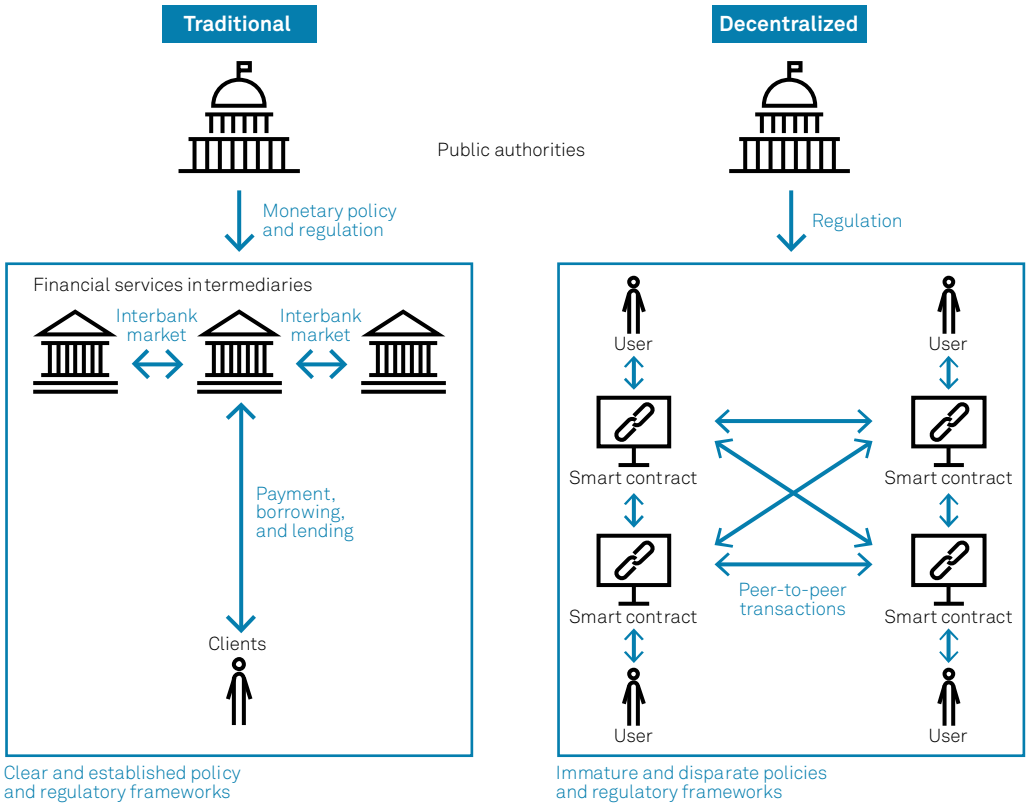
The development of this new set of financial rails has a myriad of implications across financial markets. As an operating paradigm, the distributed ledger offers the potential for efficiency gains by reducing or eliminating the need and role for intermediaries to execute transactions in both primary and secondary markets. As a result, market participants will design and implement entirely new workflows and operating regimes, where the degree of disruption to established intermediaries will be driven by several variables, including technology capabilities, scalability, and the pace of adoption by market participants.

Alongside execution impacts is the formation of new types of digital assets. Some of these assets are digitally native (e.g., bitcoin and altcoins), while others may be digitized versions of traditional assets (e.g., bonds, equities, real estate, art, or fiat currencies). The emergence of new digital asset classes may usher in an expanded paradigm for managing portfolios of traditional and digital assets. In turn, the introduction of these new types of assets requires new data and risk analytic frameworks and capabilities that will integrate traditional measures of risk and performance (such as volatility, correlation, diversification, liquidity, credit, and factor exposure) with new types of analysis and measures (e.g., hash rates, network effects, and protocol risk).

Beyond the functional capabilities and portfolio management approaches related to digitalization, market participants also face the uncertainty and risks associated with building a new--or adapting the existing--regulatory framework that is fit for purpose. Defining what a digital asset is (e.g., a security, commodity, or currency), clarifying reporting requirements and tax treatment, and integrating anti-money-laundering requirements are foundational elements in the digitalization of markets. However, complicating the development of these frameworks is the lack of clarity regarding which bodies have regulatory and prudential oversight within countries and across jurisdictions, and the borderless nature of many of these technologies and activities. Some components of regulating digital assets may fit more neatly into the existing regulatory infrastructure (such as a tokenized equity holding), while others may not (such as DeFi lending). In other words, a fast-growing and evolving new ecosystem of digital assets necessitates a new model of regulation and oversight, and the sooner the better.

In addition to the regulation and oversight of digital assets, there are complex policy challenges and approaches to be formed related to monetary policy and ensuring the stability of global financial markets. The exponential growth and diversity of digitized assets, whether private cryptocurrencies (e.g., bitcoins) or stablecoins (e.g., tether) necessitates both a prompt and thoughtful set of policy responses. The acceleration of projects around central bank digital currencies (CBDCs) illustrates central banks' focus on staying relevant faced with the potential explosion in private money.

Traditional Finance Versus Decentralized Finance



Source: S&P Global Ratings.

The path ahead for digitalization and digital assets will not be a straight one, reflecting:

- The complexities of the technology;
- Wide variance in understanding and adoption among retail and institutional players; and
- The mobilization of established stakeholders who can and will shape the evolution of digitalization, with policymakers and regulators taking a prominent role.

As a result, uncertainty and volatility are likely to remain defining characteristics for the foreseeable future. And the credit implications for our rated universe will be a function of the pace of development of these technologies, the relative exposure of specific industries to disruption risk, and the ability of individual issuers to adopt or adjust to these new technologies.

We would like to thank the many colleagues who have contributed to this report to provide you with S&P Global Ratings' essential insights. Special thanks to Marcus Daley, Chief Ratings Technology Officer.