

Blockchain

How this technology
could impact the CFO

The EY logo consists of the letters 'EY' in a bold, white, sans-serif font. A yellow diagonal line is positioned above the 'Y', extending from the top right towards the center of the 'Y'.

Building a better
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Preface

This document follows a series of other published documents discussing blockchain basics and generating awareness in this emerging technology. We have applied the CFO's lens to discuss the impact of proliferation of this technology on the finance function. This document will provide a foundation to start the discussion with finance teams and discuss the implications of this technology.

Below are some of other thought leadership materials that EY has published in this area.



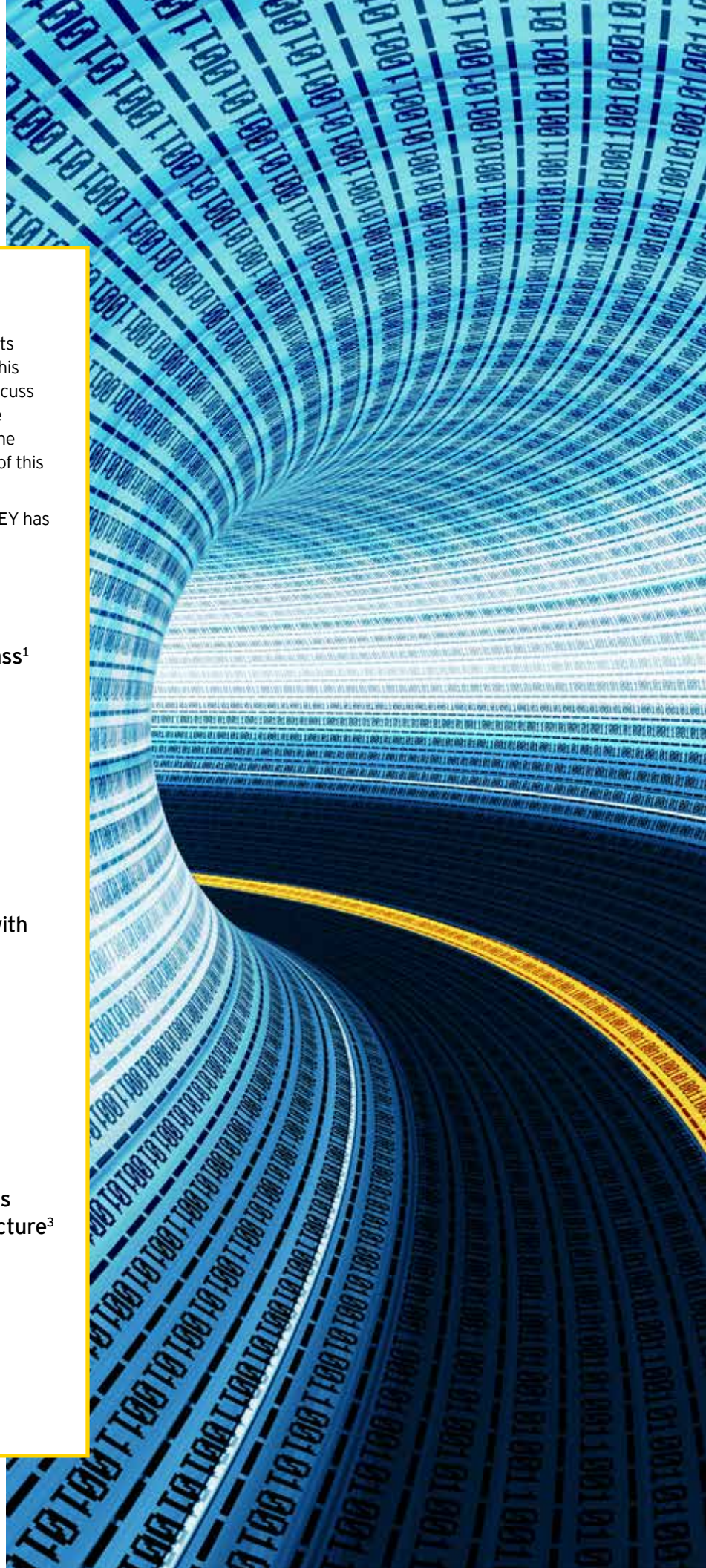
**Blockchain reaction
Tech plans for critical mass¹**



**Building digital bridges with
blockchain²**



**Implementing blockchains
and distributed infrastructure³**



What is blockchain?

Blockchain technology is a way to structure data without the need for a central authority. A blockchain is a distributed database that hosts a continuously growing number of records. The database stores records in blocks rather than collating them in a single file. Each block is then “chained” to the next block, in linear, chronological order, using a cryptographic signature; as a result, records cannot be revised, and any attempted changes are visible to all participants. This process allows blockchains to be used as ledgers, which can be shared and corroborated by anyone with the appropriate permissions. These distributed ledgers can be spread across multiple sites, countries or institutions. Although blockchain technology is the foundation for cryptocurrency (such as bitcoin), there are a variety of financial and accounting applications beyond the realm of cryptocurrency.

Types of blockchains

Based on the participants, blockchains are categorized as public, private or hybrid. This is similar to comparing the public internet and a company’s intranet.

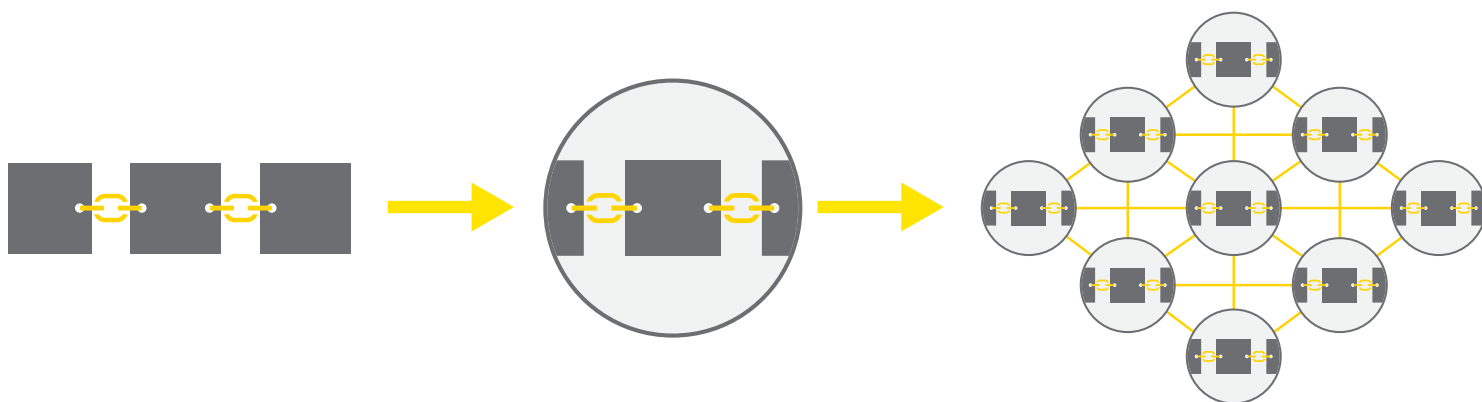
- ▶ **Public and permission-less:** Public and permission-less blockchains resemble bitcoin, the original blockchain. All transactions in these blockchains are public, and no permissions are required to join these distributed entities.
- ▶ **Private and permissioned:** These blockchains are limited to designated members, transactions are private, and permission from an owner or manager entity is required to join this network. These are often used by private consortia to manage industry value chain opportunities.
- ▶ **Hybrid blockchains:** An additional area is the emerging concept of sidechain, which allows for different blockchains (public or private) to communicate with each other, enabling transactions between participants across blockchain networks

Visual 1: Distributed ledger structure

A blockchain is made up of a series of blocks containing validated transactions.

Each block is attached to the previous block, thereby making it extremely difficult to corrupt, helping to combat fraud and allowing for accurate and complete information.

This chain of blocks is then stored and replicated across the network, enabling a distributed ledger.



Forces disrupting finance

Expectations for the CFO role and finance function are changing. In the latest *DNA of the CFO* study, 58% of the finance leaders identified “digital” as one of the four forces disrupting the CFO role. Blockchain technology is a significant component of this digital trend; it is one of the most fascinating and impactful digital disruptions shaking up the finance function. Although it is still in its early stages of development – with practical applications in financial services focused mainly on payments and exchange – blockchain could revolutionize the way the finance function operates.

How will blockchain impact the CFO?

Traditionally, CFOs have three key roles: execution, enablement and development. EY’s *DNA of the CFO* series further explains the CFO perspective. These roles comprise six segments: trusting the numbers, providing insight, getting your house in order, funding organizational strategy, development of business strategy and communication to the external marketplace. Blockchain has the potential to impact each of these segments, redefine the traditional CFO role and revolutionize the finance function. According to the study, the future finance function will use blockchains to increase IT security, manage extended value chains and streamline contract enforcement.

CFO execution role:

Trusting the numbers

A key objective for the CFO is creating a solid, trustworthy financial basis for a company. Because enhanced trustworthiness is a primary attribute of any blockchain system, this capability is well aligned with the finance function’s priorities.

Each block’s hash result is a unique identifier and is incorporated into the next block for integrity verification. Blockchains further protect data integrity by distributing a full copy of the database to each participant. All changes or edits to previous transactions must be approved by all participants, so it is incredibly challenging for individuals to tamper with records or commit fraud. Additionally, unlike a centralized system with one authority, there is no single point of failure.

Blockchain technology possesses a number of characteristics that can determine financial data is accurate, secure and simple to analyze. The technology allows for the creation of “smart contracts” that facilitate or verify the performance of a contract. These smart contracts often have logic built into code that is stored, verified and executed on a blockchain, providing a platform for self-enforcing, self-executing agreements.

Blockchain technology also enables automated tracking of these contracts and transactions, making it possible to investigate balances at the source transaction. The accuracy of all transactions and subsequent accounting entries is maintained through cryptography mathematics. With a shared ledger, data is validated at the source, making it difficult to corrupt and helping to prevent fraud in certain applications, maintaining accurate and complete data.

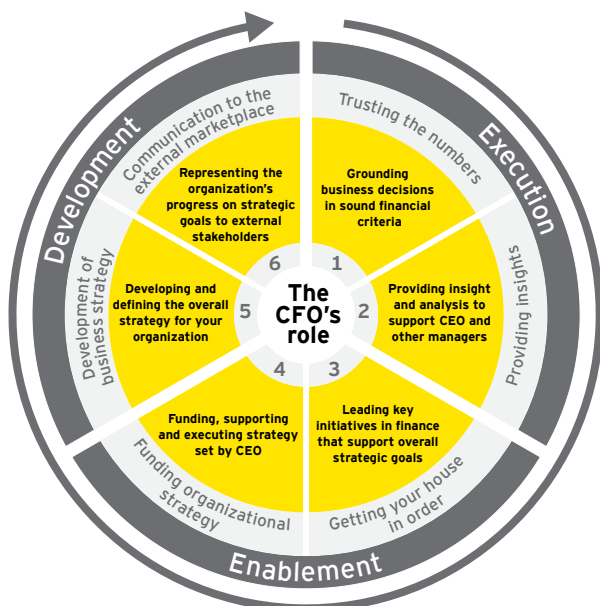
The data accessibility of blockchain could have far-reaching implications for a company’s audit process. In a decentralized shared ledger, each transaction is automatically verified by all involved parties, potentially reducing the role for an auditor to test transactions. Because of this feature, some audit activities could be automated. The inherent property of the system to maintain data integrity means that auditors will focus on confirming the validity of digital representation of physical assets and codification of contracts in conjunction with accounting standards rather than auditing transactions. This enables greater focus on more complex transactions and internal controls, fundamentally changing the scope and approach of an audit opinion.

Providing insight

Financial analyses provide insight and allow the finance function to make sound business decisions. Blockchain technology allows for a distributed ledger that could improve reporting speed, validity and access.

In a distributed ledger, all copies of the ledger are updated nearly simultaneously, creating identical copies with no out-of-sync versions. Shared ledgers can be applied within institutions across their businesses, legal entities and divisions. CFOs could see the movement of every transaction through their system and generate real-time reporting. There could also be increased visibility into payment cycle data and the movement of money down the supply chain, allowing for better predictive analysis and budgeting and the enactment of any strategic restrictions, such as departmental spending limits.

Blockchain could also serve as a valuable source of data for a company’s analytics department, enabling key strategic and operational functions to make near real time decisions. In a recent collaboration with *Harvard Business Review*⁴, EY found that fewer than 50% of analytics programs met their initial return-on-investment goals. However, having a distributed ledger with chronological records



Source: EY proprietary data

for all transactions is an accessible, verifiable source of data. This could reduce the required investment and increase the actionable insights returned by analytics and big data initiatives.

Slow and inaccurate reporting data can lead to poor decision-making, additional delivery costs and potentially unnecessary capital funding. With blockchain technology, the ledger could provide near real-time insight from verified, chronological data, thus eliminating the need for the standard reporting cycles across statutory, regulatory and management reporting.

As explained in the document *Digital Supply Chain: it's all about that data*,⁶ companies are experiencing exponential data growth that is overwhelming them and leading to false correlations, “dark data” and important strategic insights hidden among the complexity. Blockchain technology may help companies simplify and standardize complex data to allow for faster detection of market trends and meaningful information. Insights derived from more efficient analysis may then help businesses evolve their supply chains, business models and processes.

CFO enablement role:

Getting your house in order and funding organizational strategy

It is critical for finance to lead initiatives that align with the strategic goals of the business. Blockchain could provide the foundation for transforming organizations from a silo system to a network system, which increases visibility and integration across the organization. Blockchain-based applications enable an agile finance function by providing capability to track financial performance of projects in near real time. This may allow finance leadership to reallocate funds across the business to maximize return on the overall invested portfolio.

Blockchain technology could also reduce manual manipulation to increase financial efficiency. In intercompany transactions, blockchain technology would create just one version of the ledger, creating the opportunity for intercompany transparency and simultaneous settlement. Reconciliations between departments and subsidiaries could become nearly instantaneous, transparent and verifiable. The reduction of manual effort required could free up time for the finance function to focus on value-add activities, such as strategic planning and supporting wider business decisions, particularly at the critical period of the final stages of the consolidation process.

According to the *DNA of the CFO*⁵ study conducted by EY, 26% of US respondents indicated that the top CFO strategic priority for the finance function in the future is to reduce finance function costs through new technologies such as robotics and process automation. As blockchain technology develops and audit tasks become increasingly automated, utilizing blockchain in this capacity may lead to significant cost savings. Although this is a future capability heavily dependent on regulatory and legal guidance, audit practices could evolve to utilize blockchain inputs. As a result, companies could benefit from the agile financial model that accommodates new technology. The ensuing cost savings within the finance function allow for greater financial investment in strategic business areas improving overall shareholder value.

CFO development role:

Development of business strategy

In addition to overseeing financial processes, the CFO determines and carries forward overall business strategy. Blockchain could impact future strategies by enabling new transactions and altering entire business models. In a blockchain environment, finance could be embedded in digital, physical and financial assets, allowing transactions to occur automatically. This embedded capability could provide a single, digital source of the truth by automatically recording information through an asset's life cycle, as it interacts with other assets and changes ownership. This could also drastically reduce the resource cost of transferring assets within or between companies and documenting resulting ownership. Blockchain could enable an immutable real-time view of a firm's assets and transactions.

Business goals ultimately determine technologies and digital business models, and these goals and business strategies must drive enterprise data strategy. Enterprise data management strategy is the core of all digital evolution in a business, and according to Paul Brody, principal, Global Innovation Leader, Blockchain, “Blockchains are the way in which the multi-enterprise data problem will ultimately be solved.”

Communication to external marketplace

The CFO must represent the company to external stakeholders, and blockchain technology could provide added transparency for interested parties. Blockchain could make both public and private transactions more visible. Blockchain has the ability to track how an asset moves, even if the asset ownership is private. Blockchain technology may result in many supply chains operating on publicly visible distributed networks. As a result, competitors would have access to one another's information, and more business will occur in a collaborative and multi-enterprise environment, fundamentally altering traditional business practices.

Blockchain technology could also allow companies to record and store all transactions on shared ledgers. Using a combination of private and public blockchains, organizations will be able to track all transactions and share relevant data with the market. The responsibility for maintaining the ledger would be shared by a group of peers, and approval would be based on a consensus view. Utilizing a distributed ledger system could become standard practice to determine the accuracy of financial information. Blockchain technology could also enable triple-entry, or “momentum” accounting, which records real time changes to the value of a firm's assets, providing insight into the “market” valuation of a firm, in addition to the book value. Independent, inalterable records could enable more accurate and frequent audits and may become a future stakeholder expectation.

Making it real

Blockchain technology is still in early stages of development and it will likely take some time before its full potential is understood and put to use. This technology has the potential to help finance functions to simplify complexities while providing them the ability to timely and accurately report financial information and act as a key business partner in the annual planning cycles. Additionally, trust-based transactions, such as contracting, property management and identity management, are being disrupted with these technologies. At the heart of these capabilities is the distributed shared ledger.

Below are proven applications of blockchain technology that have the potential to disrupt traditional business practices. Today's CFOs will benefit by considering these applications now and planning for the future.

Statutory, management and regulatory reporting

Slow and inaccurate reporting data can lead to poor decision-making, additional delivery costs and even unnecessary capital funding. With blockchain, data could be published simultaneously, removing the need for the asynchronous reporting cycles across statutory, regulatory and management reporting.

Intercompany transparency

By creating just one version of the ledger, blockchain technology would allow intercompany transparency and opportunity for simultaneous settlement. This would free up immense effort spent on managing complex reconciliations and consolidations.

Contracting

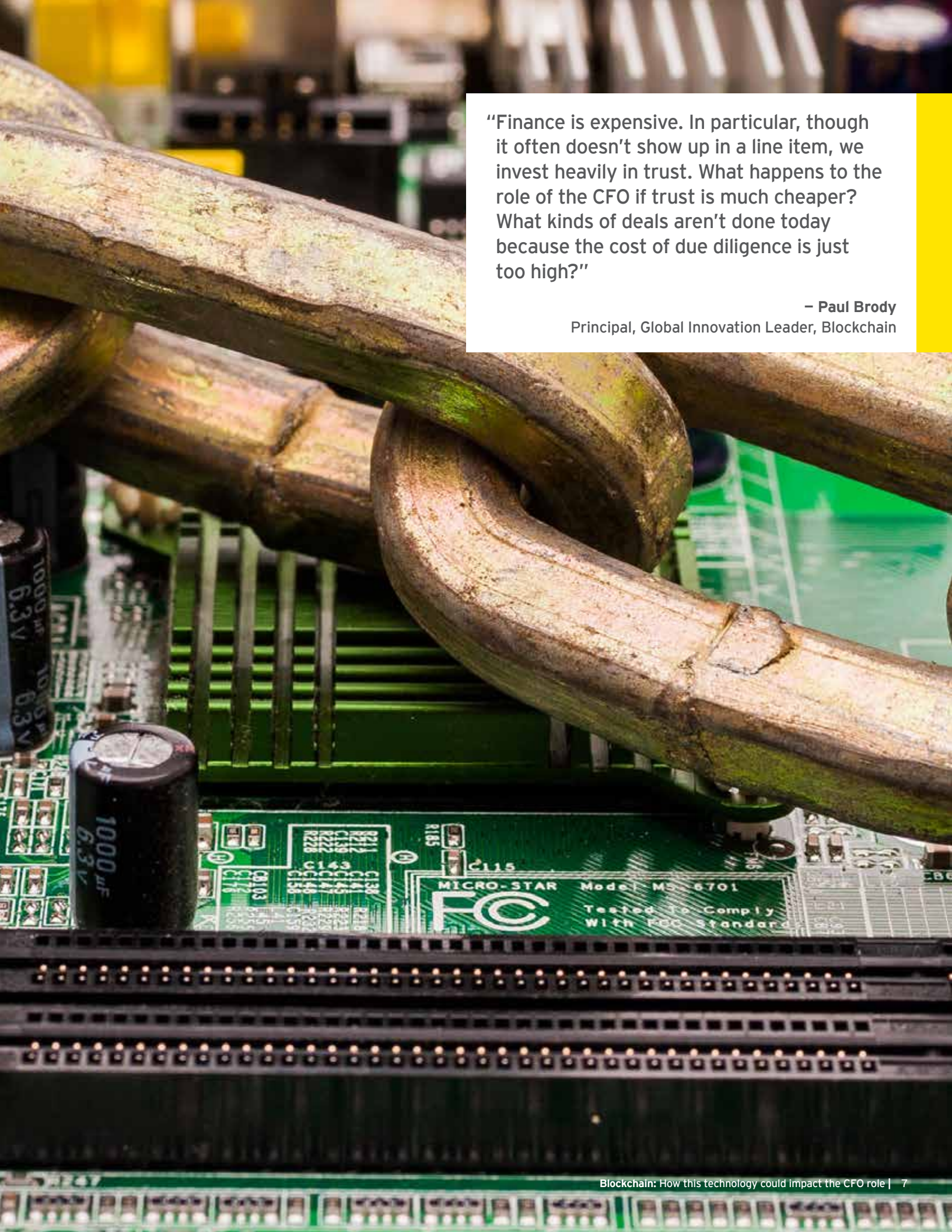
Blockchain has also proven a successful medium to enable preprogrammed contracts that have the ability to self-execute and self-enforce. Using such digitized contracting system, two anonymous parties can trade and transact without the involvement of a middleman or a trusted party. This in turn helps reduce or eliminate costs associated with monitoring and enforcement.

Property and asset management

When it comes to property and asset management, the most critical element is tracking the provenance of the property. By using the distributed ledger feature of the blockchain, this process can be simplified and strengthened by transacting a digital token through the blockchain system, eliminating the chances of corruption in transaction trail. This establishes the authenticity of the certificates, enabling buyer trust and eliminating expensive and time consuming provenance checks.

Identity management

Blockchain provides an ideal platform to manage vulnerable peer-to-peer assets such as identities. The inherent fraud management capabilities of blockchain, through hardened cryptography and distributed ledgers, allow for an easy and secure way to share digital identities. This helps transacting parties to establish trust without the involvement of middlemen or trusted third parties.



“Finance is expensive. In particular, though it often doesn’t show up in a line item, we invest heavily in trust. What happens to the role of the CFO if trust is much cheaper? What kinds of deals aren’t done today because the cost of due diligence is just too high?”

– Paul Brody

Principal, Global Innovation Leader, Blockchain

Timeline and challenges

One of the main challenges for the finance function is lack of understanding about the evolving field of distributed shared ledgers. Among the finance leaders EY surveyed, 58% globally said that they “need to build their understanding of digital, smart technologies and sophisticated data analytics” in order to deliver against their critical strategic priorities. The *DNA of the CFO*⁵ study also noted that “staff capacity to adapt to change” is the greatest barrier for CFOs to implement blockchain technology.

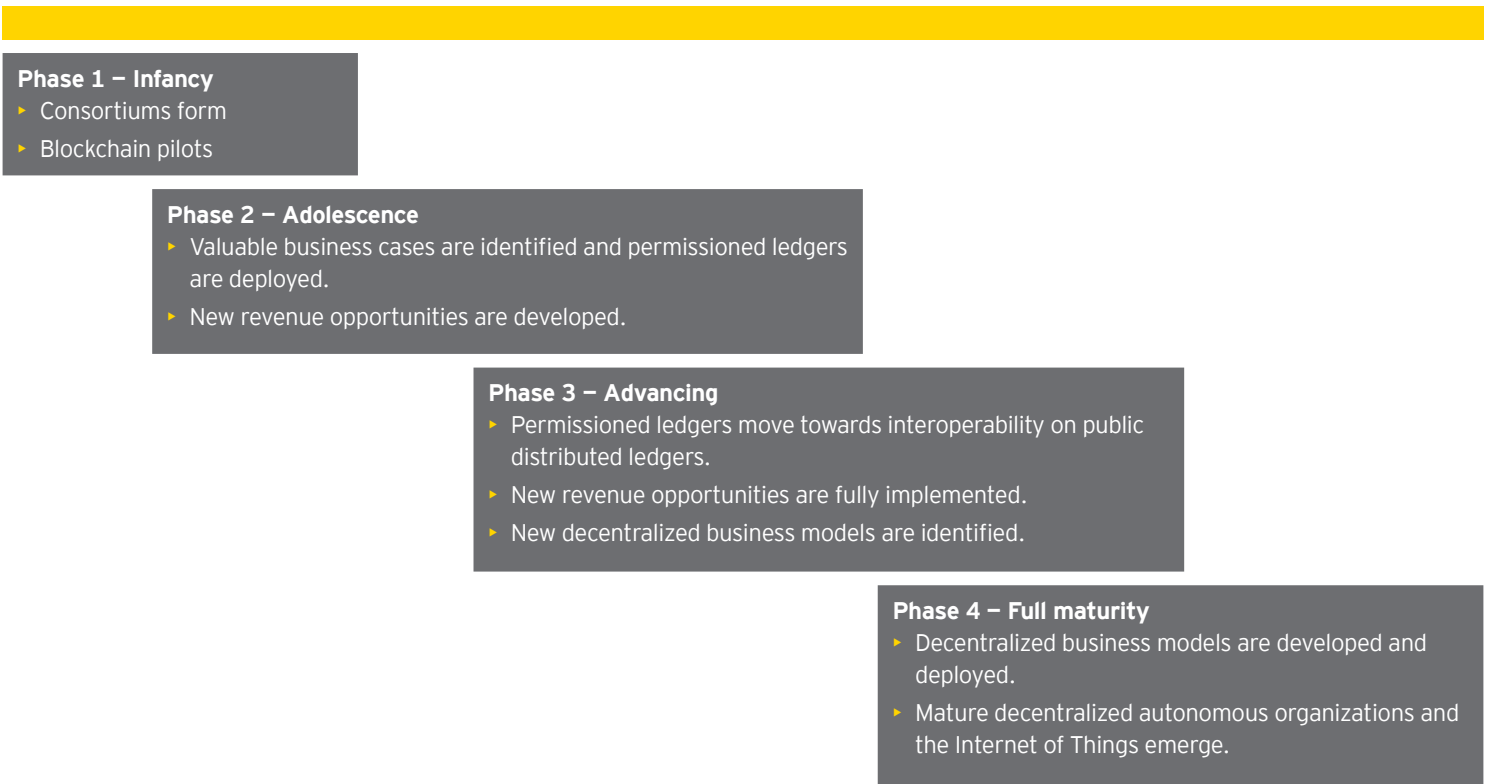
Along with understanding, blockchain still faces a “network effect” challenge, just as the telephone, personal computer and internet faced at their onset. As more users implement them, blockchain systems will become increasingly valuable. There will be an inflection point as blockchain moves from the early adopters to the majority, and legacy systems and data migrate to blockchain. The transition could be accelerated as blockchain regulations, tools and infrastructure are built out and refined. EY has been involved in working groups with IFRS, FASB and XBRL, who are working to define financial ontology and future standards.

Additionally, organizations should make sure they are not comparing the theory of blockchain with the practical nature of technology implementations. That is, rolling out a blockchain across all functions with seamless integration from outside sources would certainly solve a lot of problems, but many of our clients struggle to implement enterprise-wide data warehouses (which could do much of what we say blockchain technology can do), let alone a distributed database or network with all the associated maintenance difficulties.

Blockchain is already a practical approach to solving some problems, and large-scale systems and applications are in development. Companies are testing blockchain in controlled environments, and global systems will be implemented in the coming year. The impacts of blockchain technology may occur sooner than expected now that high-speed broadband networks can support disruptive technologies faster than ever before.

Deep Ghumman, EY Advisory principal, explains: “It’s inevitable – not a matter of if but when blockchain will impact your business. Executives need to start thinking about the implications to their organization as the underlying technology of distributed shared ledger is maturing at a rapid pace. The policies, governance and regulatory guidelines are being developed, so companies that are ready to embrace this change will be successful in the long run.”

Visual 2: Blockchain evolution timeline



Conclusion

Blockchain has the potential to change the finance function as we know it today. It will arm the CFO with tools and capabilities to allow him or her to become a key business partner in the strategic planning process while running a very efficient and trustworthy operation.

This article is an introduction to the overall impact of this technology on the finance function. We will follow up with detailed analysis of how this will impact each of the finance functions along with some of the immediate next steps that the finance leadership can take to get ready for the blockchain revolution.



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- ⁵ "The DNA of the CFO," EY website, ey.com/dnaofthecfo.
- ⁶ "Digital supply chain: it's all about that data," EYGM Limited, 2016.

Additional source material

"Chain reaction: how blockchain technology could revolutionize the finance function," EYGM Limited, 2016.



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