Blockchain rewires financial markets

Trailblazers take the lead

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survey conducted by
The Economist Intelligence Unit

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The IBM Institute for Business Value with the support of the Economist Intelligence Unit surveyed **200 Financial Markets Institutions** in **16 countries** on their experience and expectations with blockchains. What differentiates the early adopters and what can we learn from them?

First movers: Trailblazers set a fast pace and new direction

In 2017, 14 percent of financial markets institutions in our study expect to have blockchains in production and at commercial scale.

These Trailblazers may be small in number, but they're long on ambition. They're prioritizing blockchain efforts to act on invisible threats – both new competitors and new business models – as well as to acquire the trusted information that supports bold endeavors like these.

Opportunity seekers: Trailblazers prioritize key business areas for best benefits

Cost, immutability and transparency benefits: Trailblazers focus blockchains on four areas – clearing and settlements, wholesale payments, equity and debt issuance, and reference data.

New business models: Trailblazers expect blockchains to yield the greatest effect in opening up new business models in three of the same four areas – clearing and settlements, wholesale payments, and equity and debt issuance.

Shifting profit pools: New vectors for growth and disruption

Disruption postponed: Most financial markets institutions, including those in the Trailblazer segment, aren't anticipating substantial disruption from blockchains. Regulations and the need for market conventions to achieve scale may have extended the time horizon for any anticipated disruption.

Investing for growth: Financial markets institutions are investing most heavily in identity and know your customer (KYC), clearing and settlements, collateral management, reference data and corporate actions. These areas face new regulations, which may in part be driving initial investments to solve problems that could pinch the bottom line rather than present the greatest opportunities for growth.

First movers

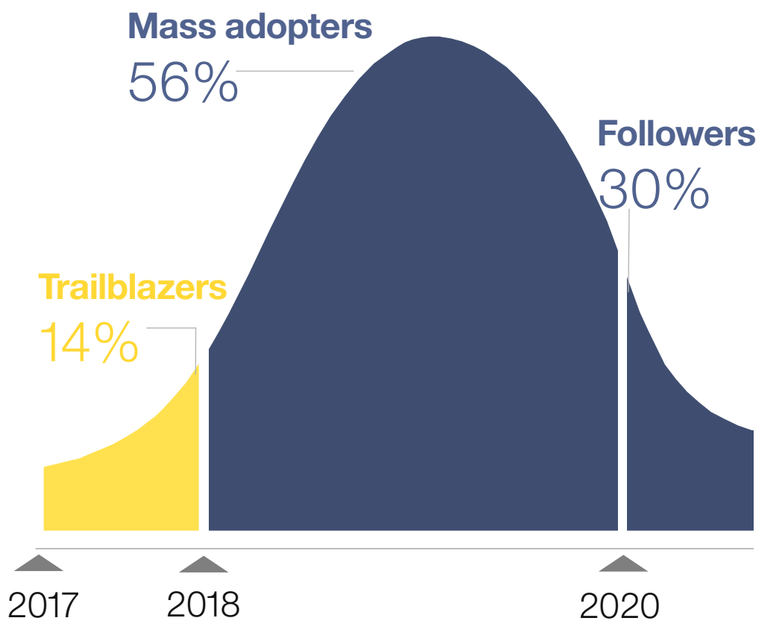
Trailblazers set a fast pace and new direction

In the past two years, institutions in the financial markets industry have swarmed to blockchain pilots and proofs of concept. They've opened innovation labs, sponsored hackathons, teamed with fintechs, joined consortia and worked with regulatory bodies to pave the way for blockchains. Major institutions like Nasdaq have begun executing trades on a blockchain. Others, like the Depository Trust and Clearing Corporation (DTCC), anticipating disintermediation, have initiated pilots with banks on credit swaps and with Digital Asset Holdings on repos: a USD 2.62 trillion market.[1]

This flurry of activity has led to speculation by experts: Are financial markets institutions caught up in a hype cycle? Or are they ready to commit to blockchains faster than previous new technologies? Fourteen percent of the financial markets institutions in our study expect to have blockchain solutions in commercial production, and more critically, at scale in 2017 *(see Figure 1)*. Our conclusion? Analyzing their responses across a number of areas, these first-movers we call the Trailblazers may be small in number, but they are long on ambition.

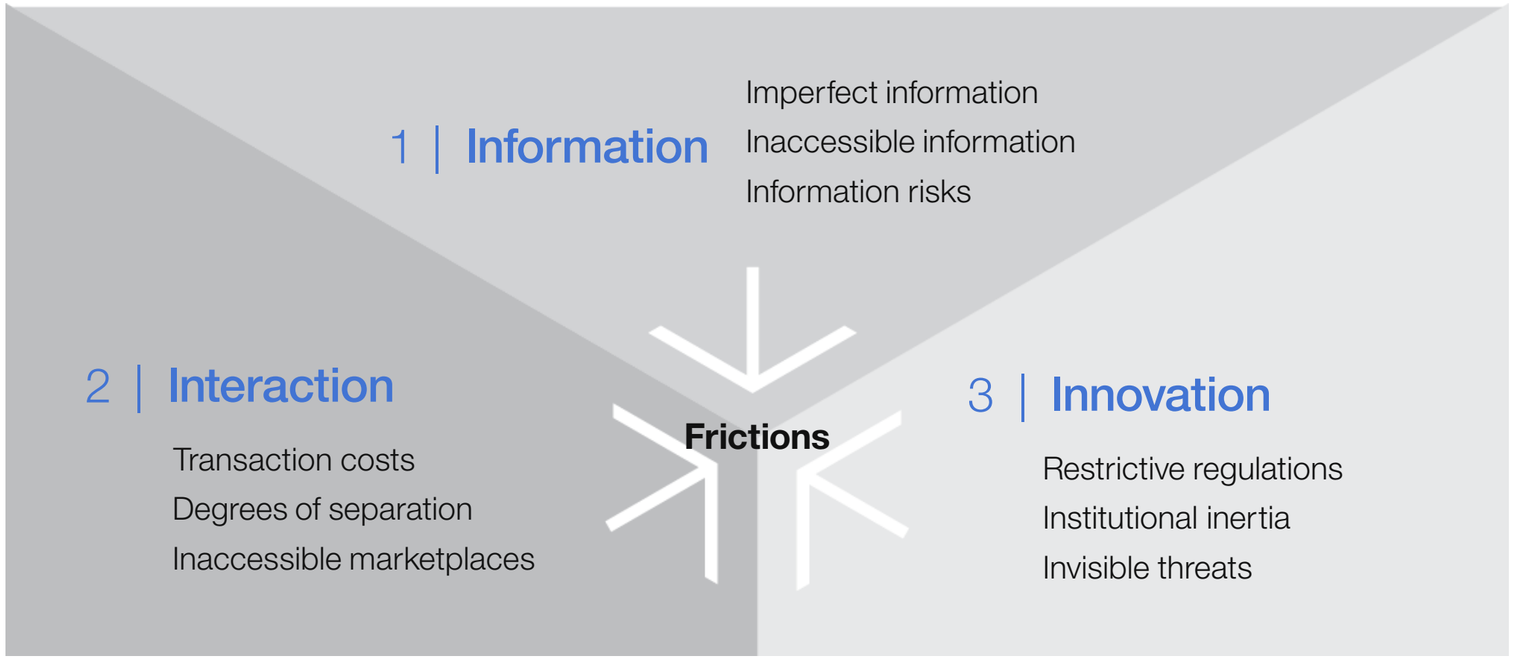
The Trailblazers segment is dominated by capital markets, which make up a full 50 percent of the Trailblazers, compared to 36 percent across our study. Seven in ten are smaller firms, with fewer than 20,000 employees.

Figure 1. *First to finish: Respondents' expectation of when they will have blockchains in commercial production and at scale*



In our first blockchain study, "Fast Forward", **ibm.biz/**fastforward, we examined the potential for blockchains to eradicate the frictions that hold companies back, limit their growth and constrain innovation. We identified nine frictions that challenge enterprises today *(See Figure 2)* and analyzed the impact blockchains might have. This study asked for the views of financial markets institutions on these same frictions.

Figure 2. *Frictions framework: Information, innovation and interaction frictions can be minimized by blockchains*

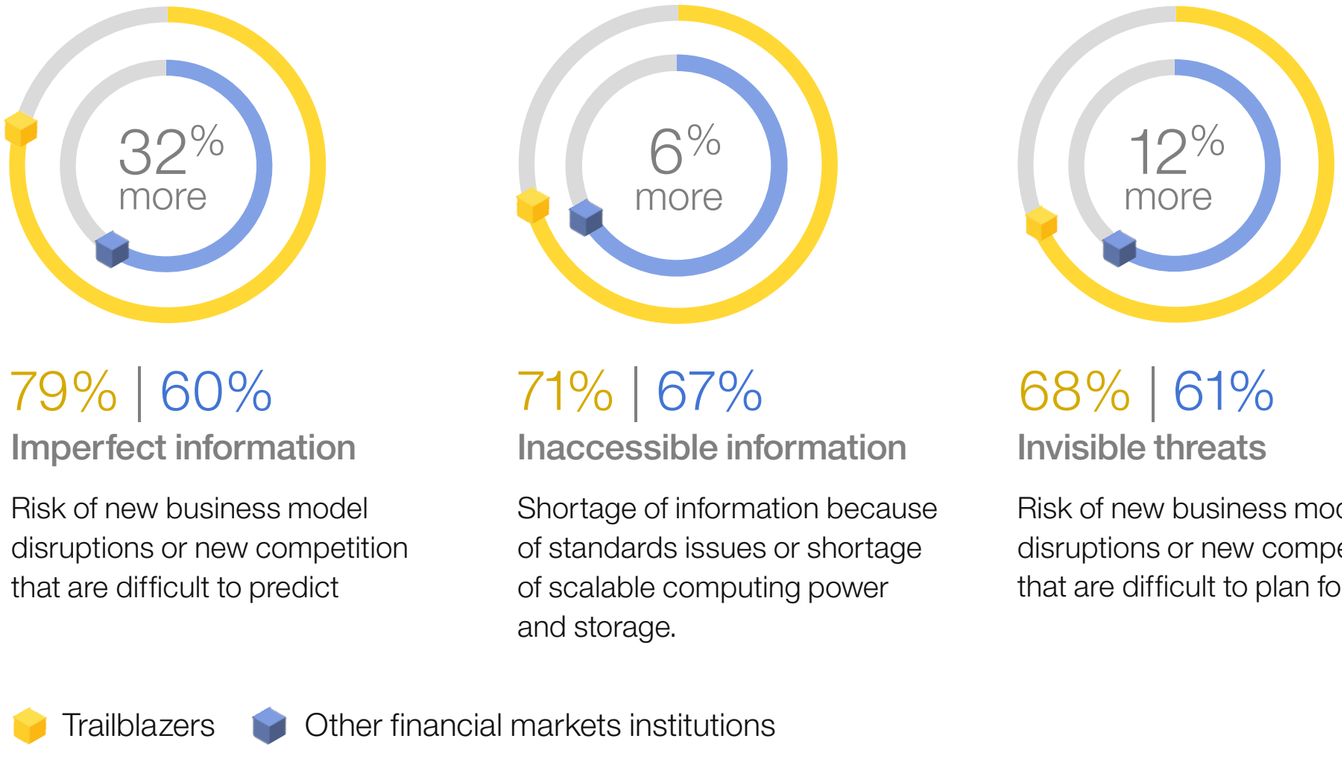


We found that Trailblazers, and indeed just about all financial markets institutions, expect blockchain to eradicate frictions across the board. But Trailblazers stand apart from other financial markets institutions in their ambition. They expect blockchains to substantially diminish the risks from invisible threats. Instead, they expect blockchains to bolster their capacity to respond to those new competitors and business models that were once too difficult to anticipate *(see Figure 3)*. To support this determination, they are focused on those frictions that bar access to trusted information – both information that may be prone to error or multiple versions of the truth – as well as information that can be difficult to access.

For some, existing regulations and the need for global market conventions have likely held back their push to imminent commercialization. For others, these same conditions may have been an impetus to act first and fast. First-mover advantages for Trailblazers include the ability to influence the business standards, favored technologies, protocols and regulations by which others will one day operate. Moreover, as start-ups target incumbents and new business models begin to scale, first-mover firms will be well situated to get ahead of any consequent disruption.

How individual institutions respond to blockchain opportunities in the next few years will, of course, depend on their circumstances, capacity and ambition, as well as their interactions with regulators. The plans, priorities and investments of the Trailblazers, however, do illuminate a direction.

Figure 3. *Path to growth: Trailblazers identify the three frictions that blockchains can most reduce*

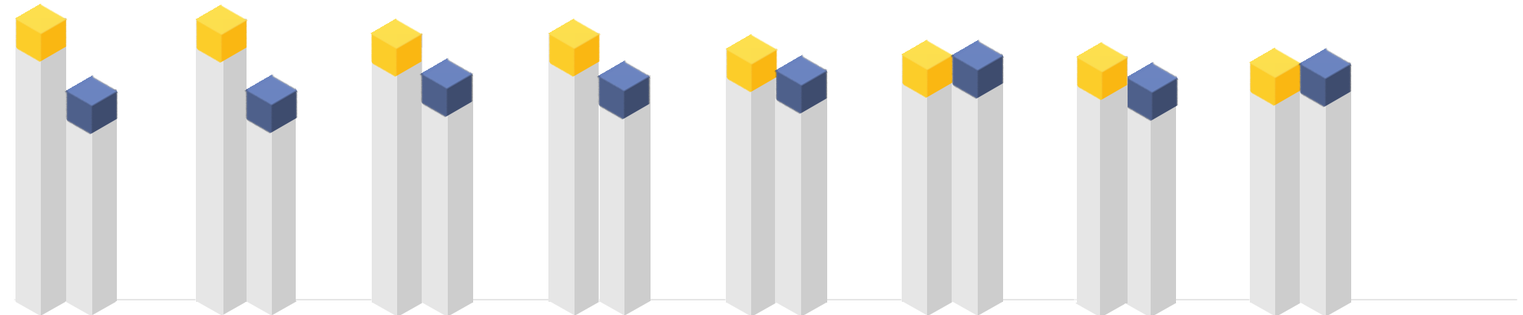


Opportunity seekers

Trailblazers prioritize key business areas for best benefits

We asked financial markets institutions to weigh cost, transparency and immutability benefits in nine areas core to their business and analyzed their answers to calculate a blended score for each business area. Our analysis reveals near-unanimity among the institutions that make up the financial markets industry, whether they're ready to go to market in 2017 or plan to take longer. They expect compelling benefits from blockchain technology in each of the areas we surveyed *(see Figure 4)*.

Figure 4. *Benefits for all: Blockchains' impact on cost, transparency and immutability*



	Clearing and settlement	**Wholesale payments**	**Equity and debt issuance**	**Reference data**	Identity and know your customer	Collateral management	Corporate actions	Syndicated lending
Trailblazers	79%	79%	75%	75%	71%	69%	69%	67%
Other financial markets institutions	59%	59%	64%	63%	65%	69%	63%	67%

Opportunity seekers *(continued)*

Trailblazers have determined that four areas should benefit most from the process improvements introduced by blockchains – *clearing and settlements, wholesale payments, equity and debt issuance,* and *reference data.* Asked where blockchains would best open up new transformational business models, Trailblazers named three of these same four business areas: *equity and debt issuance, clearing and settlements,* and *wholesale payments (see Figure 5)*. A concentration of pilots in these areas is one indication that the industry may have been attracted first to those activities that pose the greatest disintermediation risk to market infrastructure participants.

Figure 5. *Trailblazers' top three blockchain-enabled business models*

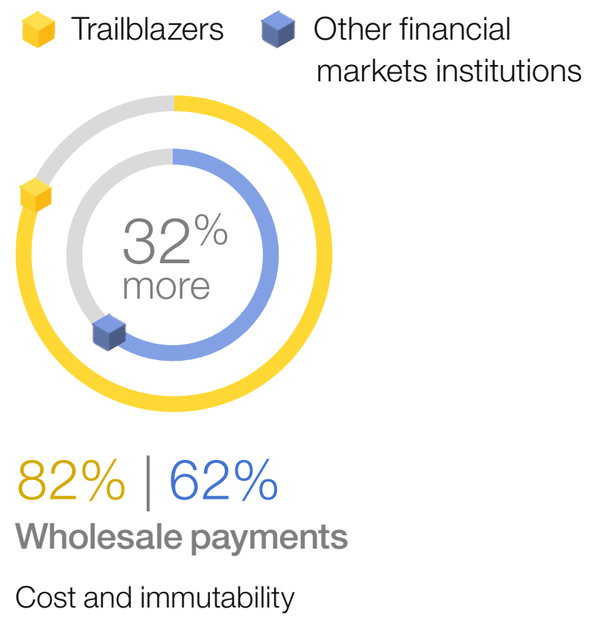
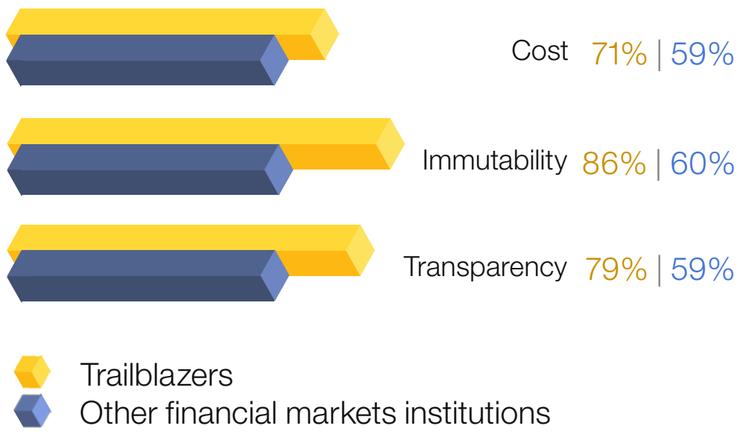


Figure 6. *Key Trailblazer clearing and settlement benefits*



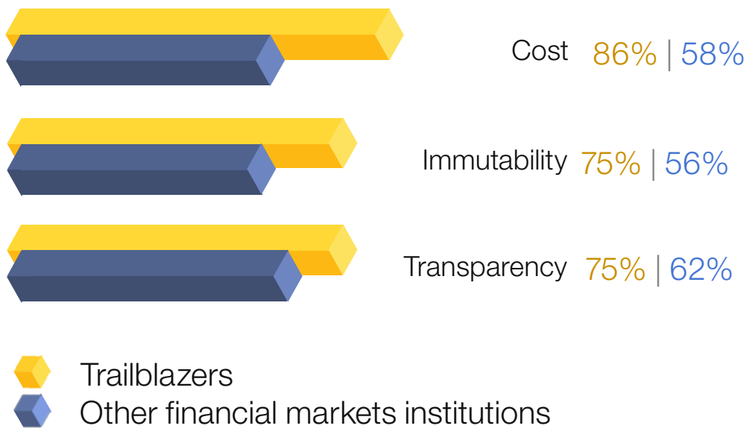
Clearing and settlements

Of all the business areas surveyed, Trailblazers calculated the greatest benefits from the immutability of data and transactions that will accrue to *clearing and settlements (see Figure 6)*. Forty-three percent more Trailblazers expect blockchain benefits such as the elimination of failed trades to arise from immutability.

Clearing and settlement activities are not without regulatory complexity. Issues like failed trades or the legal treatment of settlement finality on the blockchain have yet to be resolved. But the benefits of moving settlement to blockchain environments are significant. Nasdaq expects its blockchain initiative, Linq, could reduce settlement risk by more than 99 percent.[2]

Others have tested settlement times for securities and contend that a process that currently takes three days could soon clear on the same day. Mizuho Financial Group, one of the largest financial groups in Asia has already demonstrated that cross-border securities settlement on blockchains can occur almost instantaneously.[3] In January 2016, the Australia Stock Exchange (ASX) began running a blockchain pilot for investors to “radically simplify and speed up post-trade processing,” reduce risk and compliance costs for its clients, and significantly speed up settlement – potentially to same day or even near real-time.[4]

Figure 7. *Key Trailblazer wholesale payment benefits*



"Using an open-source DLT solution will ensure the appropriate levels of confidentiality, security, standardization, scalability and flexibility required to create a meaningful network effect across the financial industry."

Tom Zschach, Head of Technology and Operations at CLS

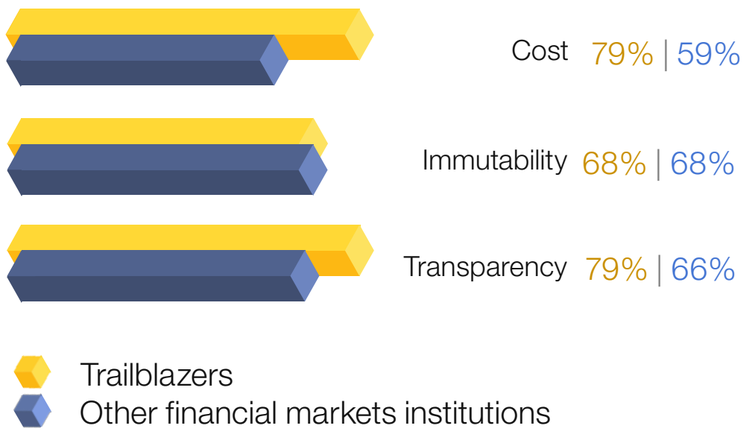
The Japan Exchange Group writes, in a working paper on blockchain proofs of concept, "Applying DLT [distributed ledger technology] in capital market infrastructure has great potential to contribute to generating new business, enhancing business operations, and reducing cost and even rebuild the financial business models that exist today."[5] Incumbents and fintechs alike are convinced that as financial markets institutions look further down the road, new peer-to peer custody and settlement networks on blockchains could disintermediate, or at least change the role of, the middlemen once required to confer trust.

Wholesale payments

Like settlements, wholesale payments are an opportunity to inject speed. These high-value transactions are slow, but because they are also less frequent with fewer transactions generated daily, speed is not the most critical objective. Instead, Trailblazers value the opportunity to reduce the costs of these intensely manual transactions; indeed, across all the business areas, they ranked wholesale payments as the first to benefit from cost savings *(see Figure 7)*.

CLS Group (CLS), a leading provider of risk management and operational services for the global foreign exchange (FX) market recently announced that it has secured 14 institutions to join its new payment netting service on the Hyperledger blockchain for buy-side and sell-side institutions. The global market has been limited by the lack of standardized payment netting processes for trades not settled within the current CLS environment, contributing to higher costs and increased intra-day liquidity demands.

Figure 8. *Key Trailblazer equity and debt issuance benefits*



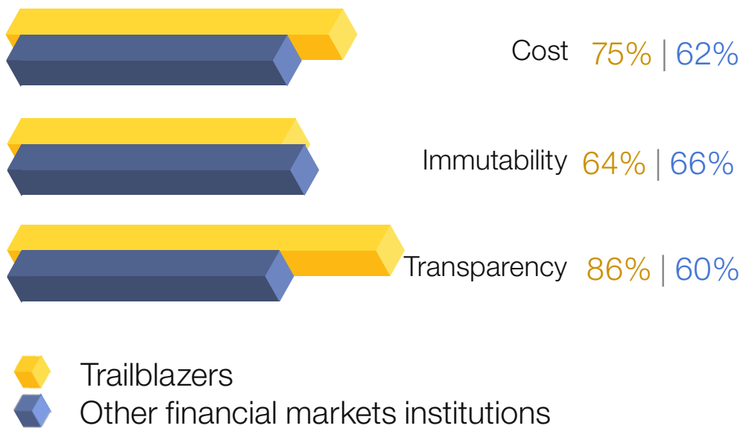
Equity and debt issuance

Despite the need for regulatory oversight and liquidity to trade equities and other instruments, financial markets Trailblazers expect significant transparency and cost benefits to emerge as blockchain-enabled trading platforms become established *(see Figure 8)*. SBI, a Japanese consortium of 15 banks has turned to blockchains to enable a new payments platform that includes round-the-clock settlement.[6] Banks' fees would be cut by 90 percent. They expect their new service to go live in spring of 2017.

From the start, financial markets institutions have looked beyond efficiency to consider radically new business models for equities and debt markets. These include peer networks that issue and distribute illiquid instruments, as well as new product wrappers where investors would own shares of a digitized fund on a blockchain.

In July of 2015, Overstock, an e-commerce corporation, became the first to issue its own corporate bond on a blockchain, eliminating the possibility of naked short selling and reducing settlement time to near zero. Six months later, it earned regulatory approval to issue equities on the blockchain. In September 2016, Overstock announced it was partnering with Keystone Capital to work with regulators on its blockchain platform.[7]

Figure 9. *Key Trailblazer reference data benefits*



Reference data

On blockchains, reference data *(see Figure 9)* is automatically captured in real time, validated and shared as permitted across business divisions and institutions. It becomes in effect, an ongoing and constantly up-to-date, self-integrating system of truth. As data siloes are connected to blockchains, benefits build up: Costly and time-consuming reconciliations are all but eliminated, and an instantaneously verifiable audit trail discourages bad actors. Data integrity is assured and financial institutions gain a superior platform for up-to-the-minute analytics and real-time reporting, a service their clients value greatly.

Ultimately , the data embedded in transactions, such as instrument, time or trust level can inform smart contracts that automate interactions, reducing costs and time. Although Trailblazers don't view reference data as particularly ripe for business model change, it's anticipated that blockchains could help firms monetize data to create other new financial services. Reference data, less burdened by regulatory complexity than other activities, is an attractive place to start blockchain initiatives.

Recently, a group of seven buy-side and sell-side firms along with the Securities Industry and Financial Markets Association (SIFMA), joined forces with blockchain firms Axoni and R3, to complete a multi-month proof of concept exploring how blockchains could simplify reference data processes. Reference data makes up 40 percent to 70 percent of financial transaction data, and due to lack of automation and a reliance on legacy systems and processes every institution is required to keep its own record of reference data, introducing inconsistencies and requiring resources for reconciliation. Blockchains help reduce duplicate reference data costs and improve data latency which will ultimately lower costs and reduce operational risks.[8]

When cost, immutability and transparency benefits from blockchain are considered independently of each other, additional business areas stood out. Trailblazers rated *collateral management* second and *corporate actions* third in immutability; *identity and KYC* second in cost savings.

Shifting profit pools

New vectors for growth and disruption

The institutions that make up the financial markets industry are surprisingly complacent about the prospects for disruption from blockchain. The same cannot be said of their commercial and retail banking peers. In our study "Leading the pack in blockchain banking", **ibm.biz**/blockchainbank we found the majority of Trailblazers in the commercial and retail banking industry anticipate significant disruption in five of the nine areas core to their business. By contrast, the majority of financial markets Trailblazers don't expect much disruption in any of the business areas surveyed. What accounts for such a starkly different view?

Despite the benign to encouraging attitudes that regulators have demonstrated to date, regulations in financial markets may be constraining innovation and the entrance of new competitors. At the very least, current regulations are likely extending the time horizon for disruption. *Equity and debt issuance* is an area where the potential for business model disruption is high, but requires working closely with regulatory bodies to bring a solution to market.

The requirements for scale – and consequent liquidity – also play a bigger role in some markets. So too do business standards. Everything from how to define a credit default swap, or manage margin and collateral, to the legal treatment of blockchain related disputes will need to be agreed upon before global efforts can reach scale. In financial markets, there are hundreds of thousands of financial instruments and only a nascent initiative to define a business ontology for them. This, combined with extremely complex processes defined by market convention and subject to stringent, changing and occasionally contradictory regulatory requirements, may be a drag on blockchain adoption. Disruption, it is likely, won't be avoided; instead it may simply be postponed.

Invest to grow

Financial markets institutions are investing most in five areas: identity and KYC, clearing and settlement, collateral management, reference data and corporate actions *(see Figure 10)*.

Figure 10. *Set to spend: Areas of investment and disruption identified by all financial markets institutions*

Trailblazers identified *deposit taking, mortgages, retail payments, corporate lending* and *consumer lending* as primed for disruption. Leaving no flank exposed, 9 in 10 Trailblazers plan to invest in each one. In some areas, they're out the gate early. Trailblazers are more than twice as likely as other banks to invest in *retail payments, consumer lending* and *corporate lending* blockchain initiatives as early as 2016.

Inefficiencies in collateral management are estimated to cost banks up to

USD 4 billion annually[9]

Paradoxically, the areas where financial markets expect to invest are not, with one exception, the activities that they believe represent the greatest benefits or potential for business model transformation. This suggests that financial markets are investing to solve problems created by new regulations instead of investing in areas that represent the greatest opportunity to grow, innovate and acquire new customers.

Investments in collateral management, for example, are likely fueled by new regulations for uncleared derivatives, which could erode margins. As collateral becomes a more constrained resource, the need to move and manage it more efficiently grows.

Just one area for significant investment – clearing and settlements – was also ranked in the top three in benefits or business models. But it too is an area where new conventions are imminent and could be driving investment. By the end of 2017, T+2 is expected to replace the current 3-day convention for settlement in the U.S. equities market.[10]

Investment from all financial markets institutions is robust. Trailblazers' investments are off the charts. Each firm told us they're investing by 2018 in every one of the business areas we surveyed. The areas they are focusing on first illuminate their priorities compared to other firms. They're more than twice as likely to invest in *wholesale payments* (50 percent versus 23 percent) and *collateral management* (25 percent versus 12 percent) in 2016. They have also prioritized *clearing and settlement* for early investment (32 percent versus 17 percent).

Recommendations

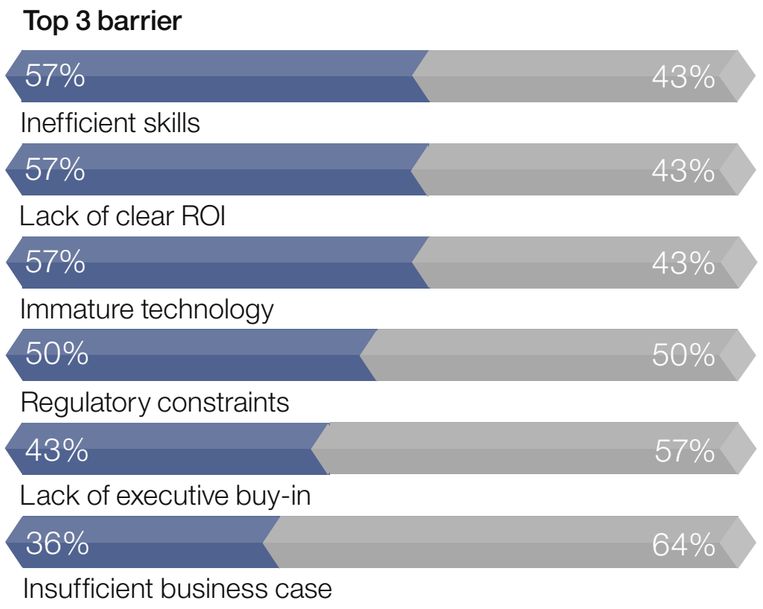
To extract the most value from blockchains, financial markets institutions should answer the following three questions:

How fast should we move?

Fourteen percent of surveyed executives have already started. These Trailblazers are setting a fast pace and charting a direction for early advantage. Mass adopters can look to Trailblazers for lessons learned, but they should be prepared to join them in real-world applications as soon as possible.

For half our survey respondents, regulatory complexity and constraints seem an impenetrable barrier to blockchain adoption *(see Figure 11)*. Regulators and legislators the world over are participating in consortia to determine how regulations might change – and regulators might benefit from blockchains. Leading financial markets institutions are collaborating with regulators on blockchain projects to earn approval for implementation. Collaborations like these are influencing the future regulatory environment and driving blockchain adoption.

Figure 11. *Barriers to implementing blockchains today*



How can we scale across business networks?

Once blockchains have scaled across multiple parties, they can begin to achieve the kind of network effects that drastically reduce the frictions that curb growth. Trailblazers are already working on the new business and technology standards required for scale. Mass adopters should join them and begin building strong partnerships, including joining the consortia that are establishing business standards today.

Six in ten organizations view immature technology as a barrier *(see Figure 11)*, and five in ten cite the need for robust mechanisms to establish identity and a high degree of control over access. Security and privacy standards will bring more participants into blockchain networks and drive scale.

The Linux Foundation's open-source technology initiative, Hyperledger, has a core focus on identity and permissions. Institutions are working together on Hyperledger to set the technology standards that advance interoperability across blockchains and help ensure that blockchain platforms can evolve as conditions change.

How can we innovate with new revenue models?

Our data shows that only four in ten institutions today have already identified areas where a clear return on investment is probable *(see Figure 11)*.

Consortia lay the groundwork for a better understanding of blockchain's benefits, but many financial markets institutions already recognize that more focused collaborations with a few key partners is also necessary to innovate business models. New revenue models must anticipate the potential for disruption in areas core to business today and in the future. Whether defending each area or just a few, the surest offense is to focus early and fast on the opportunity to implement new revenue models.

However the market evolves, blockchains will add at least one new revenue stream; the potential to monetize reference data looms large. Financial markets institutions should factor this into their thinking from the outset.

Notes and sources

1. Prisco, Giulio. “DTCC and Digital Asset Holdings to Test Blockchain Solutions for the $2.6 Trillion Repo Market.” Bitcoin Magazine. March 30 2016. https://bitcoinmagazine.com/articles/dtcc-and-digital-asset-holdings-to-test-blockchain-solutions-for-the-trillion-repo-market-1459358814
2. Warner, Matthew. “Nasdaq Linq Issues Shares With Blockchain Technology.” Allcoinsnews. January 4 2016. http://allcoinsnews.com/2016/01/04/nasdaq-linq-issues-first-shares-with-blockchain-technology/
3. IBM press release. “Mizuho Financial Group and IBM to Test Blockchain Technology for Settlements Using Virtual Currency.” June 23 2016. http://www-03.ibm.com/press/us/en/pressrelease/50009.wss
4. Digital Asset press release. "ASX Selects Digital Asset To Develop Distributed Ledger Solutions For The Australian Equity Market." Jan 21 2016. https://digitalasset.com/press/asx-selects-digital-asset.html
5. Alembakis, Rachel. “Blockchain – the next level.” TraderNews http://www.thetradenews.com/Technology/Blockchain---The-next-level/
6. Ripple website. “SBI Ripple Asia Announces Japanese Bank Consortium.” Aug 19, 2016. https://ripple.com/insights/sbi-ripple-asia-announces-japanese-bank-consortium/
7. del Castillo, Michael. “Overstock: Broker-Dealer Deal Will Open Blockchain Floodgates.” CoinDesk. September 16, 2016. http://www.coindesk.com/tos-first-broker-dealer-could-open-blockchain-securities-floodgates/
8. Lambert, James. “R3 and Axoni explore the use of distributed ledger technology to reduce risk in reference data management with buy and sell side financial services firms.” R3CEV. September 20 2016. https://r3cev.com/press/2016/9/20/press-release-r3-and-axoni-explore-the-use-of-distributed-ledger-technology-to-reduce-risk-in-reference-data-management-with-buy-and-sell-side-financial-services-firms
9. Skinner, Chris. "Applying Blockchain to Clearing and Settlement." Fintech Ranking. August 28 2016. http://fintechranking.com/2016/08/28/applying-blockchain-to-clearing-and-settlement/
10. SIFMA Resource Center. "Shortened Settlement Cycle." http://www.sifma.org/issues/operations-and-technology/shortened-settlement-cycle/overview/

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Veena Pureswaran, Sanjay Panikkar and Sumabala Nair. "Empowering the edge: Practical insights on a decentralized Internet of Things." IBM Institute for Business Value. March 2015. **ibm.biz**/empoweringedge

Paul Brody and Veena Pureswaran. "Device democracy: Saving the future of the Internet of Things." IBM Institute for Business Value. September 2014. **ibm.biz**/devicedemocracy

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