HIGHLIGHTS AND KEY TAKEAWAYS

The \$80 Trillion Fintech Conundrum

Who Wins the Future of Asset Management? February 2020

FINTECH COLLECTIVE

Over \$80 Trillion of Assets Are Pooled and Invested Globally in today's Asset Management Industry. Over the past 20 years, we've seen technology transform nearly every sector of the financial world. Across payments, banking, insurance, and other sectors, we've seen fees compressing and a new generation of companies bringing enabling technologies and disruptive threats.

But, asset management broadly, and the buy-side more specifically, has been slower than other sectors to see digital and data-driven transformation. As we look to the next ten years, we expect to see significant change.

Recently, FinTech Collective and Goldman Sachs co-hosted a conference at Goldman's offices in London, bringing together some of the brightest minds in tech, with a group of 80 CEO/CIOs from asset managers and asset owners.

The afternoon was pitched as a series of conversations on the evolution of asset management, from the perspective of traditional active, fundamental firms and asset owners.

The presenters and panelists looked to the future, exploring what's next across infrastructure, product, and distribution.

Looking at fintech in asset management provides roughly equal parts information, inspiration, and anxiety.

> At FinTech Collective, the evolution of the buyside is a topic that hits close to home. The founders of the firm met in 1999 in a business called Multex which revolutionized the distribution of sellside research to the buyside. Multex IPO'd in 2001 and was later acquired by Reuters in 2003.

These trends have the potential to incite evolution and revolution...

THE INDUSTRY FACES HISTORIC CHALLENGES

FEE COMPRESSION

While global AUM roughly tripled from \$27b in 2002 to \$79b in 2017, fees as a percentage of AUM are down by over 25% – and the downward pressure is only accelerating. This is forcing the industry to find new ways to drive revenue and retain profitability.

SHIFT FROM ACTIVE TO PASSIVE

Index funds globally collected almost \$700b in 2018, while actively managed funds lost nearly \$100b. 92% of actively managed large cap funds have underperformed the S&P over the last 15 years.

ACCELERATING HUNT FOR YIELD

Investment in alternative assets has doubled from \$6tn to \$12tn globally over the last decade. Demand for these assets has increased as asset owners look for yield outside the stock market, which is near all-time highs, and some underfunded pension plans look to make up for lost time.

THE BIGGEST ARE GETTING BIGGER

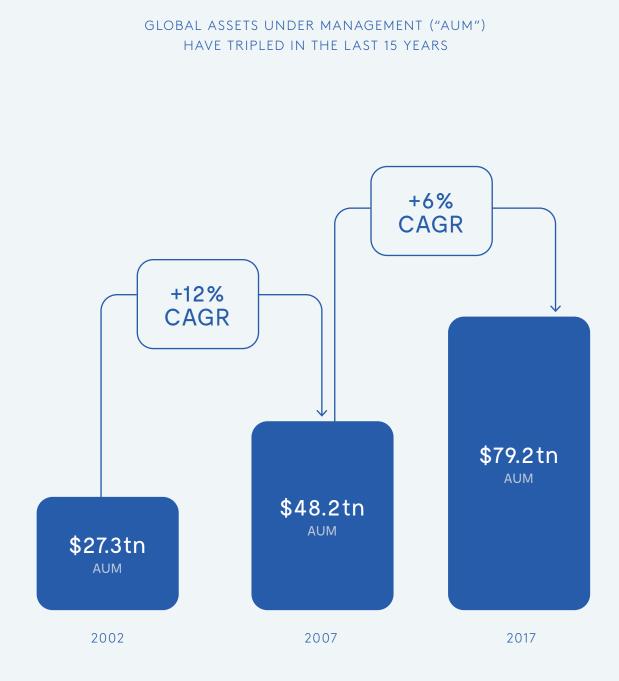
81% of net inflows in the U.S. in 2018 went to the top 10 asset managers. Large index fund providers like Vanguard and Blackrock continue to grow their AUM, while smaller more specialized firms carve out niches. The asset managers in the middle are struggling – and perhaps most in need of digital and data-driven transformation.

GROWING INTEREST IN ESG

Institutional and retail investors increasingly seek to align investments with values, with demand growing organically and driven by regulatory pressures from Europe.

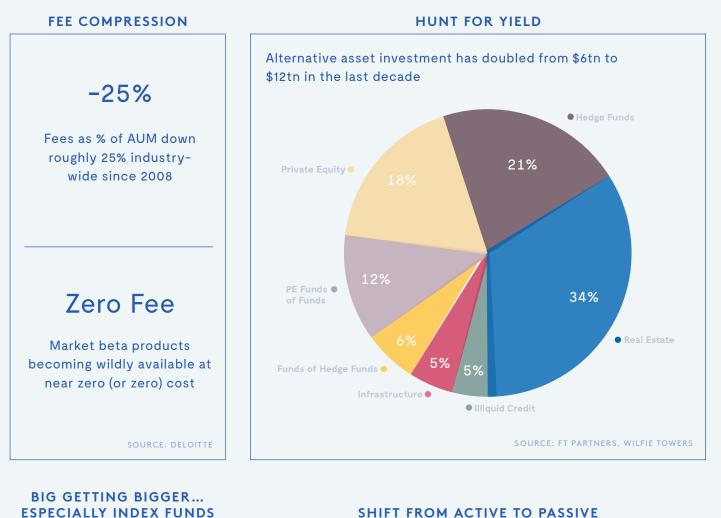
BLOCKCHAIN AND CRYPTOCURRENCIES

As an asset class, digital assets are relatively small but growing quickly – and perhaps the most innovative net-new product to invest in. At the same time, blockchain technologies may become critical in reinventing the back-end infrastructure in the industry as it copes with fee compression.

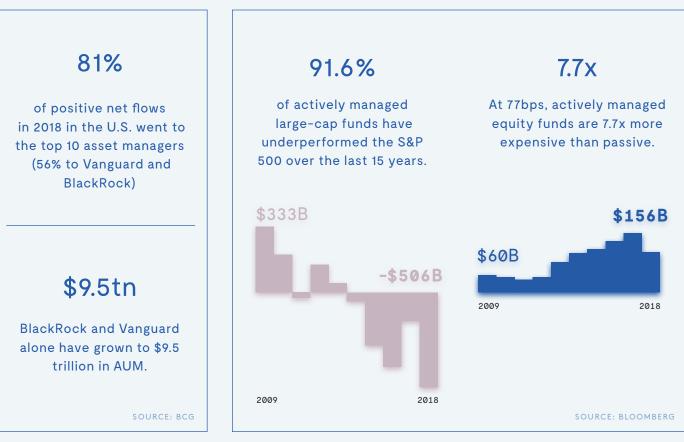


2.1% AVERAGE ANNUAL NET INFLOWS FROM 2002-2017 SOURCE: BCG

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SHIFT FROM ACTIVE TO PASSIVE

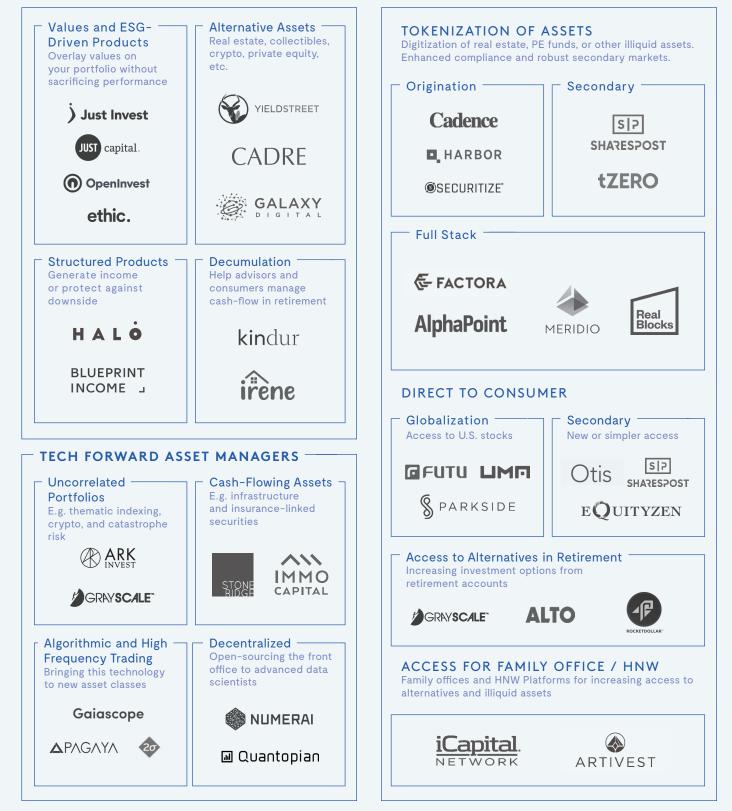


Asset Management: Investable Themes and Select Companies

INFRASTRUCTURE



INNOVATIVE PRODUCTS



DISTRIBUTION

9

Re-Architecting Legacy Infrastructure

Marty Chavez, Co-Head of GS Securities Division Previously served as Chief Information Officer and Chief Financial Officer

Moderated by— Jo Hannaford, Goldman's Head of Technology, EMEA

Key Takeaways—

THE DOWNFALL OF SPREADSHEETS

When Mr. Chavez started at Goldman in the early 90s, he had a vision for a technology platform that could power Goldman Sachs into the future. However, a massive challenge he encountered was "manual tracking and reconciliation of data across the firm – a mess of hundreds of thousands of spreadsheets." Mistakes and inability to provide real-time insights plagued Goldman.

AND THE RISE OF SECDB

Mr. Chavez recognized that that they could not scale the business if the workflow was manual, so he led the effort to effectively ban spreadsheets. He viewed a digital, API driven framework as the gold standard - but simply connecting APIs into the legacy infrastructure wouldn't fix underlying issues. So, they aspired to "redevelop Goldman's core data structure to scale capacity and resilience." The hard work involved developing an internal source of truth, before developing APIs and user interface.

HIGHLIGHTING THE IMPORTANCE OF MARQUEE

Marquee is at the forefront of underlying changes in the securities division. It's effectively the layer that enables Goldman's institutional and corporate clients to digitally consume Goldman's content, including risk analytics and pricing data, and engage with the firm for more efficient trading. As one client noted, "A good relationship with Goldman Sachs is you (Mr. Chavez) and I having lunch once a year, and I never speak to anyone at GS the rest of the year - because everything I receive from GS will be through APIs."

SHOULD TRADERS LEARN TO CODE?

Mr. Chavez believes the principles of computer science should be studied by traders, even if they aren't full-time programmers. "The ones who understand code, are the ones who are least likely to be replaced over time." Mr. Chavez underscored the need to understand basic frameworks, and have a basis for faster problem solving. This is a principle not just for traders – it applies to many fields. "Ultimately the regulators who code will be the best in their field as well."

What's interesting about Marquee from Goldman, and as you look further at something like Aladdin and eFront from Blackrock, is the largest and most respected players taking significant steps to provide infrastructure for the industry.

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Re-Thinking the Product Offering & the Post Fund Future

James Waldinger, Co-founder of Artivest Artivest simplifies alternative investments for wealth platforms, fund managers, and investors.

Philip Brittan, CEO of Crux Informatics Crux is streamlining data delivery for asset managers, who spend most of their time wrangling data rather than finding signal in the noise.

Bryan Healey, CTO of Aiera A.I. to weaponize analysts and portfolio managers, with automated tooling and predictive modeling for fundamental analysis.

Josh Levin, Chief Strategy Officer at OpenInvest OpenInvest helps investment managers customize accounts at scale, using stocks rather than funds.

Moderated by— Matt Levinson, Principal at FinTech Collective

Key Takeaways—

OUTSOURCING INNOVATION TO STARTUPS

Mr. Brittan from Crux notes that the asset management industry is "seeing a disaggregation of the enterprise into an interlocking supply chain, where specialty technology firms are bringing efficiencies and expertise and leveraging economies of scale." Crux Informatics is an excellent example of this premise, providing critical middleware and data infrastructure to connect alternative data providers with asset managers. Today, asset managers are "replicating the same efforts, thousands of times across firms" – and spending the "valuable time of expensive machine learning experts on data wrangling."

HYPER CUSTOMIZATION OF PORTFOLIOS

With passive investing and commoditized index funds becoming the norm, how can advisors look to differentiate? One key vector of differentiation is personalization. Mr. Levin, cofounder of OpenInvest, discussed how "advisors need to incorporate clients' preferences when constructing beta." These preferences could span ESG or other personal values, individual tax considerations, or other factors (e.g., do you work for Apple and want to exclude that stock?). Mr. Levin drew a unique analogy to CDs and DVDs. "With streaming, the music industry collapsed into your iPhone. There could be a similar dynamic in asset management, with advisors given the ability to 'manufacture' personalized products on the spot."

DISTRIBUTION OF ALTERNATIVE ASSETS

One key trend for asset owners is the hunt for yield – which involves sourcing opportunities

in alternative asset classes. Mr. Waldinger, founder of Artivest, noted that "there is little standardization for data or reporting across alternatives. Artivest solves this with a distribution platform that incorporates better apples-to-apples comparisons."

BRINGING MACHINE LEARNING AND AI TO ASSET MANAGERS

Despite having expanded their budgets for alternative data and machine learning, many asset managers have failed to see the ROI to date. They've had difficulty bringing machine learning talent in-house, and difficulty finding signal in the vast noise provided by alternative data. Mr. Healey, founder of Aiera, posited that "Some of this expertise should be outsourced to startups. Ultimately, asset managers should not reinvent the wheel when it comes to machine learning."

BUILDING A STARTUP FOCUSED ON WEALTH AND ASSET MANAGEMENT IS HARD - WHAT ADVICE DO YOU HAVE FOR FOUNDERS?

Our panelists noted the importance of having committed investors, given potentially long sales cycles and slow progress before hockeystick growth. For enterprise software in this segment, the founders all emphasized the importance of having an anchor client to provide credibility. But make sure you are selling into decision makers! Mr. Levin from Openinvest noted that "I spent thousands of hours talking to dozens of people in the innovation department of [unnamed financial institution]. They had an infinite number of people willing to waste my time!"

These founders are squarely focused on helping asset managers and financial advisors adopt new technology as they strive to differentiate.

Some are taking an evolutionary approach (e.g. improved data infrastructure) while others are more revolutionary (e.g., turning the advisor into a product manufacturer).

Blockchain - From Myth to Production in Institutional Markets

Greg Schvey, CEO and Founder of Axoni A portfolio company of both FinTech Collective and Goldman Sachs. Axoni is providing distributed ledger infrastructure for financial institutions.

Moderated by— Gareth Jones, Managing Partner at FinTech Collective

Key Takeaways—

"AT AN ABSTRACT LEVEL, BLOCKCHAIN ORDERS DATA."

Capital markets data is often processed in batches. Mr. Schvey articulated that this raises a common question – "Am I looking at the same information as the rest of the market?" This fundamental issue leads to friction across banks and broker-dealers when it comes to reconciliation, clearing and settlement. In order to solve this problem, Axoni is "building the new digital assembly line for the capital markets. Reconciliation is instantaneous, records are immutable and accessible." Mr. Schvey sees a future where "data stores are natively communicating with each other, synchronized, and contracts are electronified and written in code."

THE \$11 TRILLION GAME CHANGER

Axoni is building the first institutional scale use of the blockchain in re-platforming the trade information warehouse ("TIW") at the DTCC for the credit derivatives market – where \$11 trillion of notional value is traded every year. Axoni has been working with the DTCC and its 12 largest users, "who process 85% of the world's credit derivatives trades." Axoni's infrastructure, put simply, will allow data to be ordered and synchronized – removing expensive software maintenance and data reconciliation costs along the way. This is a fundamental evolution in the \$11 trillion credit derivatives market.

AND A DECENTRALIZED USE CASE

Axoni is also building data and clearing infrastructure for the equity derivatives market, where they are working to synchronize data post-trade for all parties involved. This is an OTC, effectively "decentralized," market where "blockchain connectivity would better serve all participants."

THE BUYSIDE AND BLOCKCHAIN

Mr. Schvey noted that "while the sell-side is relatively interconnected, the buyside is more fragmented." That's painful for the buyside when trying to reconcile and synchronize data – and Axoni is attempting to address this, even if they are leading with the sell-side.

Enterprise use cases of private, permissioned DLT (distributed ledger technology) are near-term actionable and happening across a multitude of financial services verticals.

Within capital markets and asset management, much of the \$55bn of reconciliation and administrative costs for post-trade settlement can be eliminated through having a real-time, share source of truth.

Axoni's implementation of DLT is a watershed moment for the global banking industry in reimagining the way trade information is recorded and shared.

Digital Assets: Perspectives from a New Asset Class

Charles McGarraugh, Head of Markets at Blockchain Markets Blockchain provides non-custodial cryptocurrency wallets, data services, and a crypto exchange direct to users all over the world.

Maex Ament, CEO of Centrifuge Centrifuge is an open, decentralized platform to connect the global financial supply chain.

Dan Morehead, Founder of Pantera Capital Pantera Capital is an investment firm focused exclusively on ventures, tokens, and projects related to blockchain tech.

Tom Ogilvie, CEO of Staked Staked provides the technology that allows cryptocurrency investors to earn a yield on their holdings.

Moderated by— Sean Lippel, Principal at FinTech Collective

Key Takeaways-

CRYPTO AS AN ASSET CLASS

Digital assets have grown from \$10 billion to \$250 billion in just three years. Mr. McGarraugh from Blockchain notes that "BTC is still only 1/100th the size of gold – there's a lot of growth still to be had." Mr. Morehead noted that "endowments such as Harvard and Yale allocated both directly and through venture funds." Further, Bitcoin has appeared uncorrelated to the other major asset classes. Dan Morehead revealed that "we have a chart at Pantera that plots all the data of equities, bonds, and crypto. None of it is correlated to crypto." Institutions may come off the sidelines and start investing.

BUT WHERE CAN INSTITUTIONS HOLD THEIR CRYPTO SECURELY

Mr. McGarraugh opined that "the custody problems are in the process of being solved. Onboarding friction is still problematic, not to mention the KYC burden. In the future, the question is who can scale endpoint custody with good UX. We need to handle the capacity of a bank and the load of Facebook. At Blockchain, we are trying to solve that for financial services."

HOW BLOCKCHAIN CAN HELP REVOLUTIONIZE ASSET MANAGEMENT

The use of blockchain can bring transparency, reduction in costs, governance and the ability to aggregate demand and fractionalize supply. The potential impact across the industry is far-reaching. Mr. McGarraugh described blockchain as a "radical disintermediation machine" – with the potential for immutable, open-source ledgers to replace many of the industry's rent takers.

DECENTRALIZED FINANCE

Mr. Ogilvie discussed how platforms like Staked can "now give you the ability to collateralize your digital assets and earn 6-10% annual yield." Moreover, many startups are attempting to tokenize real-world assets and securities – potentially bringing liquidity and robust secondary markets to these asset classes. Mr. Ament from Centrifuge (who previously founded supply chain finance provider Taulia) discussed the possibilities for invoice factoring to be enabled via blockchain. "We plan to address the supplier of fabric in Southeast Asia, five steps downstream. It's currently being priced incorrectly by factoring companies today."

TALENT CONTINUES TO FLOCK TO BLOCKCHAIN

The panelists observed that the talent in this space has expanded "beyond libertarians and enthusiasts to A+ developers who want to push the cutting edge of this technology." Moreover, Mr. McGarraugh observed that experienced finance professionals are joining blockchain startups, eager to "help the industry mature and incorporate tested institutional knowledge."

Whereas many startups addressing wealth and asset management are "evolutionary," blockchain and digital assets have the potential to be "revolutionary." Indeed Bitcoin (and cryptocurrencies) may be in the early innings of a net new asset class.

The potential to decentralize and disintermediate many sectors across finance has opened the imaginations of an entirely new cohort of entrepreneurs.

The Innovator's Dilemma

FinTech Collective co-founder, Brooks Gibbins sat down with Curtis Arledge, CEO of the Mariner Investment Group and former Senior Research Associate at the Forum for Growth and Innovation at Harvard Business School.

Mr. Arledge previously served as the CEO of BNY Mellon Investment Management and Chief Investment Officer for fundamental fixed income portfolios at BlackRock, Inc.

Key Takeaways—

BACK TO SCHOOL:

Mr. Arledge recently spent almost two years with Clayton Christensen, Professor at Harvard Business School and author of The Innovator's Dilemma, to study why and how market leaders get disrupted. His perspective for the research was based on a 25-year career in investment management, from being one of the first employees at Blackrock to ultimately serving as CEO of BNY Mellon Investment Management (\$2t assets).

DISRUPTION:

Innovator's Dilemma theory suggests that incumbents tend to miss the unmet need of the smallest customer. In the words of Mr. Arledge, this shortcoming can "open the door for disruptors to enter the market, leverage technology to lower costs, and deliver service to these customers on a profitable basis. After they succeed at that, they begin to move upmarket."

NEED FOR SPECIALIZATION:

Mr. Arledge reflected that today's asset managers can take a cue from this research. The biggest asset managers today are fundamentally "asset gatherers," focused on where the most AUM is accumulating (e.g. index funds). In Curtis' view, these asset gatherers will need to figure out how to become investors with deeper specialization and expertise. Simultaneously, specialization becomes the path for startup managers to enter the market.

The lessons of the "innovator's dilemma" can be observed repeatedly across fintech. Incumbent institutions, challenged to deliver profitability, focus their attention and resources on serving existing customer bases in a less expensive way - leaving themselves vulnerable to emerging challengers with no tech debt and no profit pools, who solve needs overlooked by others. The horizons of innovation are crystallizing for the buyside: retooling the active manager as the lines between humans and machines blur, highly customized and personalized products, shifting distribution lines with profits moving downstream, and hundreds of millions of emerging middle class investors with capital to invest.

Incumbents, Enablers and Insurgents

Ken Hayahara, Head of Goldman Sachs Investment Banking, Asset Manager Coverage Team

Rana Yared, Managing Director, Goldman Sachs Principal Strategic Investment Team

Brooks Gibbins, Managing Partner, FinTech Collective

Key Takeaways—

ASSET MANAGEMENT LAGS OTHER SECTORS:

As fees remain under pressure and regulation makes pursuing alpha more expensive, incumbents are challenged to test, learn, and innovate.

DISTRIBUTION CHALLENGES:

The first wave of disruptors were platforms offering low to no fee robo advice. These directto-consumer platforms primarily demonstrate the power of digital customer acquisition. Silicon Valley is not likely going to be able to wake up, "burn the industry to the ground", and start again. The complexity, regulation, and human emotion involved in "slow money" decisions will leave the industry as substantially intermediated for some time to come.

REGIONAL DIFFERENCES.

Asia, Europe, and the US are each contributing something different to how the industry evolves. In China, product is embedded natively in "super app" chat platforms like WeChat. But the product set is extremely limited. Europe has set the tone for regtech innovation with the unbundling of equity research (via MiFID II), ESG considerations (via regulations such as Article 173 in France), and data privacy and security (via GDPR). The U.S. brings the most interesting companies in machine learning and quantamental investing as well as addressing the needs of retirement savings and decumulation.

DOES DIVERSIFICATION MATTER?:

Scale is an inevitable drumbeat when looking at the asset management sector. But it will be interesting to see how firms navigate both innovation and consolidation with the regional differences in ownership: in the US, 2/3rds of assets sit with core, standalone asset managers, but in Europe, 70% of assets sit with buy-side firms who are affiliates of large insurance companies and banks. Innovation and M&A could look very different.

The traditional buyside is the last segment of financial services to get organized around the disruptive innovation taking place. Budgets are not there for innovation from within, and the business model does not incentivize risk-taking.

The institutional channel will be more demanding at a time when fees are compressing, and retail customers have more choice and access than ever. Distribution is fragmenting, and regulation makes it more difficult to pursue alpha.

The good news is that experimentation has never been less expensive.

Appendix Company Descriptions

Aiera

A.I. to weaponize active managers

Aiera leverages neural networks (often referred to as "deep learning") to provide investment insights to active fundamental investment managers.

Aiera analyzes the full body of publicly accessible information (including social media, news, earnings transcripts, SEC filings, video feeds, and more) with a proprietary neural interrogation tool and advanced linguistics techniques.

Artivest Simplifying alternative investments

Since 2011, Artivest has been helping financial advisors and high-net-worth investors across the Americas, Europe, and Asia build better portfolios by transforming how they identify, access, and invest in institutional private alternative strategies.

As the leading independent digital platform for hedge funds, private equity, private debt, and real assets, the Artivest Open Network delivers simplicity through intuitive technology, accessibility through disciplined product structuring, and efficiency through data-driven distribution.

Run by accomplished fintech and investment industry executives in New York and California, Artivest is proudly independent and privately held by its employees and outside investors including Aquiline Capital Partners, Genstar Capital, KKR, Thiel Capital, and FinTech Collective. Axoni Distributed ledger infrastructure for financial institutions

Axoni is a capital markets technology firm that specializes in distributed ledger solutions. The company was founded in 2013 and has since established itself as a leader in blockchain technology through successful partnerships with top-tier investment banks, asset managers, and market infrastructure companies.

Axoni's AxCore technology has been deployed across a variety of markets ranging from complex derivatives to high-volume foreign exchange.

Notably, Axoni has earned the role as the industry's choice to re-platform the system underpinning the legal records, lifecycle events, and cash flow calculations for the \$11 trillion credit derivatives market.

Blockchain Connecting the world to crypto

Blockchain provides non-custodial cryptocurrency wallets, data services, and a crypto exchange direct to over 30m users all over the world. It also operates "The PIT," the fastest operating cryptocurrency exchange, which can execute trades in under 50 milliseconds.

The company is backed by top-tier venture capital funds including Lightspeed Ventures Partners, Google Ventures, and others.

Centrifuge

The OS for the financial supply chain.

Centrifuge is an open, decentralized platform to connect the global financial supply chain. It allows any business to transact while maintaining ownership of their data, including their validated company details, their reputation, business relationships, and subsequent transactions.

Crux (PSI investment) Simplifying Data Delivery

While asset managers have invested tremendous time and resources in alternative data and advanced modeling, their most talented (and expensive) data scientists are replicating efforts and wasting time wrangling data. Crux provides mission-critical infrastructure that enables asset managers to become more data driven – with one solution makes it easy for everyone to find, integrate, and manage data.

OpenInvest

Helping investment managers customize accounts at scale

OpenInvest is exploring the "post-fund future" by algorithmically constructing client portfolios from individual stocks (rather than ETFs or mutual funds). This structure enables clients to achieve beta while implementing personal preferences – e.g. a valuesbased preferences (such as removing exposure to fossil fuels) or removing specific companies (e.g. for an employee at Apple).

These founders believe that socially responsible investing could be the wedge that breaks the fund model, enabling rich customization and improved engagement with investment products.

Pantera

Leading crypto investment manager.

Pantera Capital is an investment firm focused exclusively on ventures, tokens, and projects related to blockchain tech, digital currency, and crypto assets. Pantera's various funds invest in the largest digital assets (e.g. Bitcoin and Ethereum), tokens, and private companies in the blockchain space.

Staked Generating yield on crypto assets

Staked provides the technology that allows cryptocurrency investors to earn a yield on their holdings. We run staking nodes on proof-of-stake networks and smart contracts that automatically deliver the highest lending yield on ETH, DAI & USDCC.

Staked helps institutional investors reliably and securely compound their crypto by 5% - 100% annually through staking and lending. ~25% of the total cryptocurrency market (~\$25 billion today) will use proof-of-stake (PoS) as a security model by the end of 2019.

Investors of PoS currencies can participate in governance and collect staking rewards of \$2.5b+ annually. Staked runs highly available and secure staking infrastructure on behalf of investors, covering all of the leading PoS protocols.

About FinTech Collective

FinTech Collective is an early stage venture capital firm, based in New York City and investing globally in entrepreneurs with a hunger to reimagine how money flows through the world.

The firm was founded in 2012 by serial entrepreneurs with exits in capital markets, payments and enterprise tech. Since inception, FinTech Collective has invested in over 30 companies in the US, Latin America, Africa, Europe and Asia.

Companies include Axoni, MoneyLion, and Vestwell. Exits include Quovo, acquired by Plaid; Openfolio, acquired by Stone Ridge Asset Management; and Reorg, acquired by Warburg Pincus.

The firm is currently investing out of its second fund, a \$100m fund with a focus on capital markets, wealth and asset management, banking-lending-payments, and insurance.

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