

NOW Podcast

SEASON 2 | EPISODE 7 TRANSCRIPT

Blockchains and Cryptocurrencies: Power, Potential and Pitfalls

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KEN STUZIN: Hello. This is Ken Stuzin. I'm a partner at Brown Advisory. Welcome to the NOW Podcast. NOW stands for Navigating Our World. Through these discussions, we try to better understand the world to navigate some of the most pressing questions that are shaping our lives, our culture, and our investment challenges. As we close out season two of the podcast and look to the future whether we agree or disagree with each other, the one thing we know for sure is that none of us can figure this out on our own. At Brown Advisory, we are focused on raising the future, and we hope these NOW conversations will help us do just that.

SID AHL: In the past year, cryptocurrencies have gone mainstream growing into a \$2 trillion market. VC funding into blockchain projects has more than tripled this year to over \$15 billion. And blockchain-based decentralized exchanges essentially software programs with catchy names like Uniswap and SushiSwap have processed a staggering \$450 billion of transactions in the first six months of this year. Big banks and payment processors like Visa, JPMorgan, Square and PayPal are rushing to implement their own blockchain projects and connect with this new avenue of growth and potential.

Meanwhile, investors like us have been forced to examine the potential of this new class of digital assets. Most of you have probably heard of Bitcoin. But the potential of blockchain may have less to do with Bitcoin and more to do with decentralized blockchain-based applications that cryptocurrency enthusiasts believe could reimagine the world of software, rewire our outdated financial infrastructure, and lead to a future where users become owners in the next generation of the internet.

But there are many questions hanging over this industry from its incredible volatility and issues scaling to compete with this existing internet and software infrastructure to the uncertain regulatory environment and concerns over energy usage required to run these blockchains. I'm Sid Ahl, the chief investment officer of our Private Client and Endowments and Foundations Business. And I've been spending a lot of time thinking about the power, potential and pitfalls of blockchain technologies and cryptocurrencies.

To help us better understand this fast-changing area of innovation, I sat down with three blockchain experts to explain the technology and tell us what excites and worries them most about the space today. Stay tuned after my conversation with our experts Joe, Ash and Ria. And I'm going to bring in a couple of my colleagues to unpack some of the investment takeaways.

JOE LALLOUZ: The most interesting, and weirdest people we had ever met were working on solving blockchain and crypto problems. And it reminded me of the late '90s, early 2000s in the early internet days when same thing. Everyone that I knew that was incredibly weird, incredibly smart, incredibly technical was working on this new thing called the internet. And we didn't want to drop too many parallels immediately. But the space is really esoterically

buzzing. Let's dig in and see what's going on. How does this technology work? Why does it work this way? And why is it drawing in some of the best technical minds in the world?

SID AHL: That's Joe Lallouz telling me why he was drawn to the world of crypto. Joe's the founder and CEO of a blockchain infrastructure firm called Bison Trails which was recently acquired by Coinbase. We'll hear more from him later. I'm also joined in this conversation by Ria Bhutoria who's a principal at Castle Island Ventures, a venture capital firm that invests in public blockchains.

And before that, she was director of research for Fidelity Digital Assets. And I'm going to talk with Ash Egan as well. He's focused on early stage blockchain and crypto investments as a partner at a venture capital firm, Accomplice. He's invested in a long list of successful blockchain related startups including Bison Trails, Chainalysis, FalconX, and Flow.

ASH EGAN: What a blockchain really is, is a chain of blocks. And within those blocks, you have a whole myriad of transactions some, more complex than others. This chain of blocks composes what is known as the ledger. And that ledger for public blockchains can be viewed, can be accessed by anyone in the world. So, I think what gets people so excited is this is 24/7. It's global from day one, and there's no gatekeepers. Also, within blockchains, you have certain formats particularly the ERC-20 format, and this ERC-721 format on Ethereum.

SID AHL: Okay. I'm just going to fade Ash down here. There's plenty of technical jargon and crypto speak in the blockchain world, and we don't want to get into ERC formats in this podcast. But what Ash is referring to at the end there is a platform called Ethereum which we definitely need to understand before we dive in.

ASH EGAN: Ethereum is a global permissionless machine that anyone has access to, anyone can build a top of. It is a machine where you can run logic, and you need to pay for time on that network in the form of gas. You may hear about gas fees or transaction fees. What you're effectively doing with paying gas is you're renting time on the Ethereum network. And people are building all types of applications atop the Ethereum network.

Today, we're seeing a lot happening within finance. We're seeing an emerging ecosystem of art and art platforms with NFTs. We're beginning to see signs of music. I believe long term, any kind of application, any kind of marketplace can get built on top Ethereum or an Ethereum-alternative type blockchain.

SID AHL: I'll talk with each of my guests about Ethereum, and you'll hear us refer to its own associated digital currency, Ether. And, of course, we'll talk about Bitcoin. But I wanted to start by asking Joe Lallouz about his vision for blockchain infrastructure.

JOE LALLOUZ: The idea is internet brought open access to information. What crypto is doing is open access to transfer of value. So, if I wanted to transfer value to someone else or to an entity or to a company, there's a tremendous amount of intermediaries involved in that, in every industry not just finance, in advertising in marketplaces and e-commerce. And that creates a lot of barriers. It creates a lot of fees. It creates a lot of middle people.

And so, what crypto does is it provides a trustless way to transfer value between two people or entities incredibly easily, incredibly quickly, and that lines up with how the internet enabled the transfer of information between two people or two entities really quickly and really easily.

SID AHL: So, when you think about what projects or activities are best served on a blockchain rather than a centralized system. What's on that list for you?

JOE LALLOUZ: What we're seeing. So, far that has a lot of traction are applications where a trust is a core tenant of whatever is happening in that system. So, currency is a really good one where I'm transferring money to someone or company or an individual. We're starting to see a whole lot of innovation in the finance space. I'm very broadly using the word finance here, everything from trading to lending, to insurance.

I would say that some of those are still unproven and untested, but heading in the right direction in that they're garnering a lot of traction and adoption today.

SID AHL: So, that's the kind of decentralized finance space or DeFi. I think a lot of folks are most excited about the potential in that area. Can you just talk about some of the projects that you think could be the ones that are most broadly used in five- or 10-years' time?

JOE LALLOUZ: Yeah. I think to really paint an accurate picture of the decentralized finance space, you have to think of it in a few different chunks. There's the chunk, the bottom chunk or the bottom layer which is the blockchain itself that is powering the applications. Then, you have the different applications that are built on top of those blockchains.

And then, you have the sort of amorphous chunk that's built on top of that, that are these abstracted services. So, on the blockchain side, we're seeing a lot of traction with Ethereum. Over the last few years, Ethereum is probably the most successful smart contract blockchain. And what I mean by that is that you can execute, trustlessly execute smart contracts or pieces of code on the blockchain.

SID AHL: A smart contract is a programmable contract that requires no human intervention. It takes out the middleman and replaces it with a blockchain-based protocol that monitors the commitments of both sides of the agreement and delivers value between the parties as conditions are met.

JOE LALLOUZ: And that is being used to power these decentralized finance applications. A really simple version of that is I lock money and some event happens, and then, you receive that money because that event happened. We're seeing things like prediction markets or betting happening on these smart contracts. But we're also seeing over-collateralized lending and insurance products being built in the same fashion using these smart contracts. And then, you have these products and services that are still untested that are being built on top of these new lending platforms or insurance platforms that are built on top of something like Ethereum.

So, I won't get too much into the top bucket because it's kind of amorphous and still being designed and developed and very experimental. We're seeing some really great traction in things that you have parallels in traditional finance, everything from lending to credit facilities, to trading in this sort of middle application layer. And then, we're seeing really one dominant block chain which is Ethereum in the decentralized finance space. But there's a few that are up and coming that were maybe originally billed as Ethereum killers.

But what folks are in the industry are starting to realize is they're actually most likely going to be complementary and have a specific use case that Ethereum maybe can't do as well. So, we're seeing something like Solana or Polkadot or NEAR that are sort of up-and-coming blockchains that are gaining more and more traction, but just still very early in their histories.

SID AHL: Maybe we could take a step back here, and you could just tell us a bit about Bison Trails, and what it does.

JOE LALLOUZ: Well, 2016, we decided we wanted to get involved in the blockchain space because it was super interesting. Push comes to shove, we start looking at the space and building and doing the thing that quite frankly in particular tech startup founders know how to do which is really just build. It didn't matter what we were doing if you were engaging in the blockchain space. You started to realize that the technology was still somewhat immature. It was still unreliable. It was hard to engage with. It was hard to interact with.

And more importantly, the infrastructure supporting entrepreneurs or companies in the space was basically non-existent. When I talk about infrastructure, I'm talking about the technical infrastructure. So, if you compared or contrasted with the Web2, what folks in the crypto space called Web2 space, you have these really great companies like Amazon AWS or Google Cloud or Microsoft Azure or DigitalOcean where if you want to start something, you don't have to start from zero. You're not writing ones and zeros. You're actually building upon a lot of the abstraction layers that people before you have already built.

And the crypto space, this was nascent. And nascent is maybe generous. It was actually pretty much non-existent. And so, we were building everything from the ground up, from the protocol all the way to the interfaces. If you think

about that pragmatically, it's an incredible amount of work and burden to take on, and you have to understand everything between the protocol itself and people using your application.

So, my co-founder and I were like, "The space needs a company that's focused on this," and it could help propel and grow the entire industry. So, that was how we decided to go from we like blockchains and crypto into we're building the AWS for crypto, and we're building an infrastructure platform to support folks that want to build them. So, our whole vision and mission is to make it easier for people to interact with and build on top of blockchains. We're an infrastructure as a service platform.

So, folks that want to interact with, vote, stake, build, read, write from blockchains, and they want to not have to build everything from the ground up themselves, come to us. With click of a few buttons, they can actually do some of the things that take months or years of engineering time and large engineering teams to do, very similar to what Amazon and AWS did with Web2 with the internet.

SID AHL: I think in a lot of the conversations we've had with people focused on blockchain and cryptocurrency, there's a kind of ethos of the mission of open source and collaborative and the whole space is going to grow very meaningfully and helping each other out in that mission. Do you find that's the case?

JOE LALLOUZ: The first thing is that if you've been in crypto long enough, you realize it's still the early days. This is actually still quite tiny, and that crypto has the opportunity to take over all software. The second thing is that blockchain and crypto is the world's largest open source project. It's the world's largest open source community and is the world's largest open source engineering effort in history. We've never seen a collaborative open source movement as widespread as this.

And it's just fascinating to be a part of as a technical person. There's no like single CEO or leader that's pointed in the right direction. It's incredibly collaborative. And so, absolutely, that's definitely what we see. The sentiment is incredibly collaborative. We all believe that there's much more room to grow, and we're all working together to make that happen.

SID AHL: To fully understand this world, we need to take a detour back to the first block in the most widely known blockchain and talk a bit about Bitcoin. Here's Ria Bhutoria.

RIA BHUTORIA: So, when Satoshi introduced Bitcoin, he solved a problem that many had attempted to solve before. The problem was to create a digital scarce money, and he solved this by building it on an immutable and decentralized network which is blockchain. The first block was mined on January 3rd, 2009, and it included this message. And that message was the headline of the London Times newsletter that day, and it said, "Chancellor on the brink of second bailout." And that really explains part of the intent behind Bitcoin.

And that intent was that the monetary and financial system was broken, unfair, and exclusionary. So, I think that was one of the key reasons that Bitcoin, a neutral immutable, independent, and permissionless network and corresponding asset was created. It was to give us a choice to give us an alternative.

SID AHL: Which of those properties do you think are most important in Bitcoin? And which of them do you think have evolved to be really the central use case of Bitcoin today, the decade on?

RIA BHUTORIA: It's tough to say. I feel like there are certain core properties including the fact that Bitcoin has a fixed supply, and that the fixed supply is immutable and can't be changed, and that it's an open and borderless network. And all of those properties are synergistic with one another.

So, for certain stakeholders, Bitcoin is really valuable as a digital store of value. For other stakeholders especially as we've seen over the past year and a half, it's really valuable as an alternative investment or a portfolio diversification tool. And then, for stakeholders in certain parts of the world, it's really beneficial as a cross-border settlement tool. And the stakeholder group includes crypto native businesses that have to settle transactions between one another.

And then, I think an emerging use case is this idea that higher layer networks could allow Bitcoin the asset to be used as a payment or micropayment tool for niche use cases.

SID AHL: By higher layer networks, Ria means existing payment networks like those of MasterCard and Visa.

RIA BHUTORIA: But I think that's still developing, and that's restricted by the assets volatility, and its tax treatment in countries like the United States.

SID AHL: You wrote a great piece seeking to address some of these complaints or issues with Bitcoin as a store of value, medium exchange. You just referenced a couple of them like volatility of the asset and scalability. We also hear a lot about the energy consumption of the Bitcoin network and potential use in illicit activity. Which of these limitations do you think is the most relevant to Bitcoin?

RIA BHUTORIA: I think that the narrative that has been the toughest to deal with is this idea that Bitcoin consumes significant energy and is by extension bad for the environment. The discussion is much more nuanced than that. But the fact that public discourse is able to run with this blanket really digestible statement makes it difficult to combat it or appeal to people with more nuanced analysis that it just seems like a lot of critics don't have the attention for. It's also relatively easy to quantify Bitcoin's energy consumption relative to other less transparent systems.

I think that Bitcoin's transparency is used to unfairly criticize the network without making a fair apples to apples comparison. But the good thing is that this misconception has necessitated producing estimates of how much energy parallel systems might consume. So, things like the financial system or gold mining.

I also think it's important to take a step back and ask, "Okay. So, Bitcoin consumes energy. But is it a worthwhile use of resources to secure a fixed supply borderless, permissionless, unmanipulable, independent store of value that can be accessed by anyone anywhere with a cell phone or internet connection?"

SID AHL: Some people will complain that Bitcoin is limited to its 21 million eventual issuance. But you can always have a fork of Bitcoin, and you can have Bitcoin cash or you can have Dogecoin or other coins that spin off or based on a different blockchain or what have you. How do you think that affects the kind of limited issuance thesis behind Bitcoin?

RIA BHUTORIA: That's a really good question. And I think that is one of the common pieces of pushback that come up when people are trying to understand Bitcoin. Although you can fork the code, you can't fork the community. You can't fork the infrastructure. You can't fork the miners. You can't fork the developers. You can't fork the users that hold on to their Bitcoin.

A lot of these "competitors" that have attempted to improve upon certain characteristics of Bitcoin haven't seen commensurate adoption, and it's because the market has decided that the trade-offs that Bitcoin makes to offer properties like immutability, decentralization, censorship resistance, audit ability, transparency are worth making even though it has limited scalability or it's volatile because of its inherent scarcity.

So, I think that's one of the key things to understand in this debate about competitors. It's easy to fork the code. It's much more difficult to fork the network effect that has been built up around an asset like Bitcoin or even Ethereum.

SID AHL: And so, you mentioned Ethereum. I think some people have used the analogy of Bitcoin as blockchain 1.0. And really, it's a store of value. Perhaps, it's a medium exchange. But it doesn't really have additional functionality. Then, Vitalik Buterin comes around in 2014 and comes up with Ethereum which has all of these other potential applications, smart contracts, and the backbone for decentralized finance. How do you think about the differences between Bitcoin and Ethereum and the ecosystem that's being built around Ethereum?

RIA BHUTORIA: I think that the two networks are really complementary. And I also think that the two networks make explicit trade-offs to solve very different problems. Ethereum was created to solve a different problem relative to Bitcoin. It was built to be much more open-ended and generalizable to foster experimentation, like you said, flexibility and programmability.

But the consequence of that flexibility, of that programmability was that it introduced complexity. And with complexity comes this greater risk of bugs, greater risk of unpredictable outcomes in the process. But the Ethereum community deliberately chose to make that trade-off.

SID AHL: So, basically Bitcoin has been and always will be in your mind set up the same way. We'll have the same eventual issuance. And that consistency, that reliability should be worth something and perhaps allows it to trump Ether as a store of value for that one function.

RIA BHUTORIA: Yes. Yeah. That's a great way of putting it.

SID AHL: What is most exciting to you about some of those early stage technologies in the blockchain and cryptocurrency space today? What could be the killer app? What's most exciting to you in the space?

RIA BHUTORIA: Yeah. Sure. So, there are a number of things that are really exciting stablecoins. I think it seems like a really boring logical use case. But I do think that it is one of the killer apps of the ecosystem.

SID AHL: I'm just going to jump in here and say that stablecoins are coins pegged to fiat currency like the US dollar. They lack the typical volatility scene in this asset class and have potential for use in digital payments.

RIA BHUTORIA: And within DeFi, stablecoins are one of the primitives that has allowed DeFi to grow as large as it has with the rise of both fiat and crypto collateralized stablecoins. I think that privately issued and decentralized stablecoins solve the challenge of volatile digital assets while leveraging a lot of the key benefits of digital assets and by function of running on these public blockchain networks including that they're peer-to-peer once they're issued. They're programmable. They're relatively anonymous, and they're relatively permissionless and censorship resistant. So, I definitely think that is one of the killer apps that is proliferating right now.

SID AHL: How important is it to the success of DeFi that more of what we normally think about trading and exchanging shows up in the system?

RIA BHUTORIA: I think we are starting to see some of that happening. And I feel like the tokenization of real world assets has been a trend that we've been talking about for years. And I think, eventually, we definitely need to cross the chasm and kind of integrate the traditional financial system more closely with the decentralized financial system so that if you think about institutions that are used to having all of their assets on a single platform and want to leverage assets as collateral to facilitate different trades and have that kind of capital efficiency, you definitely need to bridge the gap between traditional finance and decentralized finance.

SID AHL: Ash Egan has led a number of venture investments in the crypto space. And I wanted to know how he viewed the evolving role of some of the bigger tech and fintech companies.

ASH EGAN: I think we're going to look at the covenant of these technologies in a similar manner to the internet. And so, you have a number of forward-thinking banks, fintechs, large tech companies who are thinking about what is our crypto strategy. Similar to the internet, the ones who thought about what that next chapter would look like, they were the ones to embrace internet and all the distribution that comes along with the internet.

I think we're going to see a rise of a new breed of company and a new wave of entrepreneurs coming to the space. And so, with this kind of construct, you should have a more fair and equitable type system where a select few companies or parties have historically accrued all of the value in a blockchain network where everything's transparent, everything's global and permissionless. These should be more equitable for the users, and it reduces the gatekeeping and biases of the traditional system.

SID AHL: And so, you've led investments in kind of blockchain-enabling companies. I think of these as service providers or the kind of picks and shovels analogy, companies like Bison Trails. You've also led investments in native blockchain and token investments like Flow. Can you talk about why a project or a team would decide to structure themselves as a kind of company in the traditional sense, a centralized company versus quickly adopting a token structure?

ASH EGAN: I believe there's value in both decentralized systems and investing in those tokens and then in the traditional equity sort of value accrual type model. I'd say on the latter side, these companies are going to scale in a similar way that a traditional SaaS company whether you have a cap table, it's a few venture capitalists that are investing in that company throughout its lifetime. The founders on that side need to have a very good understanding of what's happening within the crypto world and then also how to drive revenue, the traditional means of building a business.

I see on the crypto network side, it's quite different in that a lot of times, your users and your community are the equity holders or the token holders, and they dictate the go forward. And so, for a lot of the token investments that I've made, it's less so on building out a sales pipeline. It's more around fostering and building a strong early community and then growing that over time.

I think in time maybe the two, we could see more of a convergence. But as of today the supporting infrastructure companies are allowing for crypto networks proliferation into the traditional world, and in time whether it be via DAOs or other means, I believe that the crypto networks or atmosphere will permeate into the traditional world, and it's just a matter of time.

SID AHL: So, I'd love to pull on that as well. So, you mentioned DAOs, I was going to bring up DAOs. Could you just define a DAO for us and talk about what roles DAOs might play in the future?

ASH EGAN: Yeah. A DAO is a decentralized autonomous organization. You hear a lot about DAOs at the media, and there's a lot of hype around it similar to what we've seen with NFTs and DeFi and a lot of the buzzwords within crypto. I think where it's working today is coordinating capital where you have a set of holders of the DAO. And these individuals or it could be a DAO that even owns the share in a DAO, these entities are driving forward investment. They're driving the future of whatever that DAO's mission may be.

SID AHL: Breaking it down to its core here, DAO is a tokenized organization where the token holders basically have governance rights and can help determine what it is that organization goes out and does or buys via voting.

ASH EGAN: That's right. And the first example within the crypto world of a DAO was the Ethereum DAO. The original goal of the DAO back in 2014, 2015 was to allocate and invest in projects that were getting built to top the Ethereum network. It was around 20 to 30% or so of all Ethereum that was deposited into this DAO.

DAOs can serve a variety of purposes. But a lot of times, you're holding governance rights to that DAO, and that DAO is allocating capital or resources in theory a more effective way than a centralized traditional organization might. We're still in the very early days of DAOs proliferating the traditional world. But that's beginning to change some of these DAOs. And the treasuries of these DeFi products are in the billions of dollars. And so, we may see the tide shift very quickly to founders going and pitching DAOs.

SID AHL: What do you think is the most likely place that listeners to this will be interacting with a blockchain-based application?

ASH EGAN: So, I think long-term crypto networks and smart contracts permeate every single industry. This technology, this platform is a more fair and equitable way for the users to be owners and drive value. I think the traditional model where a select few number of people and organizations on a cap table where they're the ones that are accruing all the value, and they're not necessarily the ones that are providing the value.

So, we're seeing that in finance, as mentioned before, in art and music, any industry where you have a significant amount of commerce and a select few number of parties are extracting all of the value or a significant amount of that value. I think that is ripe for disruption as it relates to crypto networks.

And so, my belief is every time you're actually interacting with the internet whether it's liking something on Twitter whether it's posting something on Facebook, posting a new Instagram post, there is value that's being transmitted. Whether you know it or not, you have advertising all these things. My belief is that ultimately should accrue to the users, to the end users who are actually providing the value.

And so, my belief is this will touch every single industry. Now, I think the question is will it be abstracted from the user experience or not? Will all of this be happening under the hood or will it be similar to the experience today where you need to go and download a wallet into your browser? I think that's an open question whether it's abstracted away from the user or if it's front and center, and you have this whole new wave of users, millennials, gen Z which are growing up with the norm of sending a transaction on a blockchain.

I think the premise of logging onto a website with your email and password, that will feel like ancient history in a few years where you'll actually be able to bring your identity, bring your rich metadata onto any network, any platform, any application. And it will be portable in a way that's more fair to the consumer, the user.

SID AHL: So, another analogy I hear a lot took the early internet is what's going on now in terms of the kind of protocol wars within the blockchain space. And we've heard a lot about Ethereum today and Ethers where a lot of the development's happening in DeFi and elsewhere. But there are all sorts of other rival blockchains, the Solanas of the world, some in different coding languages and with different priorities. Can you just talk a little bit about where we are in that evolution?

ASH EGAN: It's a great question and one that I think about all the time. And especially if you're using the internet analogy, are we in the mid-90s? Are we into the 2000s? My belief is we're on the cusp of the application era. And as it relates to the blockchains that developers are building on, it may pan out in a similar way to AWS in the cloud market share where Ethereum has an effective five-year head start within the smart contract being the sort of leading smart contract platform.

AWS had a seven-year head start. I think one analogy that is reputable is that cloud market share dominance. And will that be Ethereum being similar to AWS? My belief is the whole pie is going to grow absolutely massively. And so, that's what I'm investing in and so excited about.

SID AHL: One of the core tenets you brought up earlier is this idea that blockchain is secure. And it transfers not just data, but value. Another core tenant is decentralization. And can you just talk about how that is valued and what the trade-offs are between different levels of being decentralized? Why does the community care so much about decentralization? What does it mean and how much is enough?

ASH EGAN: What I get so excited about within decentralization is the permissionless nature of it. Anyone, you could live in your parents' basement. You could be on the other side of the world. You have the same access that someone in Silicon Valley has. And so, I think the fair nature of building on these blockchains is what gets me so excited

In a blockchain-type network, it's completely grassroots and bottoms up driven from the people who are validating and mining these blocks to the actual users. And if the users and application developers are frustrated with how things are looking and to go forward, they do have the ability to fork these networks. They can split off and build their own blockchain. I think the open source component to decentralization and blockchains really does drive innovation.

SID AHL: I wanted to ask you as an investor, how you think about investing in a world where the IP is all out there? It's all open source. And we've seen it happen a couple of times where a team has splintered off, forked, and set up something very similar just with some tweaks and could theoretically take a bunch of market share?

ASH EGAN: My focus has been on backing the founders from the earliest stages who are thinking about creating entirely new markets. I've always had the mindset back the founders that are going to transform the status quo. That mindset, you're not always going to be right every single time. But when you're right as an investor, those are typically absolutely massive wins.

SID AHL: Could you just talk a little bit about what shifts you're seeing with founders as well as with investors in terms of their focus on blockchain-oriented projects versus more traditional kind of centralized projects? So, for the fintech entrepreneur or the fintech venture capitalists, how has that shift changed in recent months or years?

ASH EGAN: So, what I've seen is a lot of the drivers for investment at traditional venture capital firm within crypto projects and companies and protocols, a lot of times those folks have actually departed and built their own firm because it's so unlike the traditional sort of investing-type model. You're building up community. You're constantly iterating. You're open source. Anyone can fork your product or your service.

And so, I think just having faith in founder's ability to execute and constantly iterate is a leap of faith that a lot of venture capitalists have not been able to wrap their heads around. And so, for that reason, you have a lot of investors who have just completely stayed away from the crypto sort of sphere. And because of that, you have a whole new breed of crypto venture capital firms. And the talent coming into this space is just unlike anything I've seen over the past five, six, seven years.

SID AHL: There are certain things that blockchain needs to get right if it's going to be the technology of the future. Scalability is a big one of those. Privacy is another. Let's pick up with Joe Lallouz again.

JOE LALLOUZ: So, privacy in blockchain is actually one of probably my current obsession. One of the things that I think is important for everyone to know more and hear more. And I don't think enough people talk about this, is that blockchains are not private. They're actually by definition public. There's this sort of misconception that blockchains are used for illicit activity because you can hide what's going on. But it's actually the exact opposite.

Blockchains are pseudonymous. So, my name isn't necessarily on a blockchain. But my address is public. If someone can tie that address to me, they know who I am, and they know everything I've ever done with the currency or the assets that I have on that blockchain. So, I think that's really important.

And so, privacy preservation is a really important concept that if we want to use different blockchain protocols to replace all software, we need to actually get right. So, I'm very excited about data control over the next 10 years. And I'm very excited about the sort of technology that's moving in the privacy preservation space in crypto.

SID AHL: Maybe, we could transition a little bit to talking about some of the potential hurdles to clear for blockchains. And I guess the biggest one perhaps is scalability. How many transactions can you process cheaply every second? Bitcoin's kind of notoriously less scalable given its design as a proof-of-work network. So, something like five or 10 transactions per second versus visa doing tens of thousands.

Ethereum's about to shift from proof-of-work to proof-of-stake, something I know you've been working on. Can you just explain the differences and the importance of proof-of-stake versus proof-of-work and the benefits and trade-offs?

JOE LALLOUZ: Simply put, they're both ways to secure a blockchain when blockchains are secured, decentralized by many different people that are not controlled by any single entity all over the world. In proof-of-work, people run these highly specialized computers that basically play one large game of guess and check together which other people don't realize. It's actually not that complicated of computing problem. It actually is a pretty simple computing problem when you're trying to mine Bitcoin. But it's your guess in checking but with these massive numbers.

But that is used to secure the ledger itself. And proof-of-stake instead of using these specialized machines to play guess and check and secure the ledger, we use economic incentives to secure the ledger, use more generalized machines. So, you can use a regular computer for the most part. But you basically use a financial backing behind these participants in the network and say, "Hey, I'm staking," which is why it's called proof-of-stake behind this actor in the network and saying, "They will be a good actor." And if they're not a good actor, the protocol is designed to penalize them financially.

And you basically will either produce blocks and earn transaction fees and rewards for producing blocks and doing the right thing for the network or the network will say, "You were a bad actor," and you'll actually get what's called slashed and penalized for being a bad actor in the network and use these economic incentives versus these sort of guess and check or computing incentives to secure the network. A lot of times, proof-of-stake, because it doesn't

use this specialized hardware, can change a lot quicker because it doesn't have to stay on pace with the hardware development lifecycle. It can actually move with the software development lifecycle which is traditionally a lot faster than physical devices.

The other thing is you can have a lot more participants involved. And as you said, Bison Trails has been involved in this process. We've been involved very early. We're incredibly early in the proof-of-stake space. We realized this trend very fast that the block production on blockchains was going to move from these specialized pieces of machine to these generalized computers that folks were going to work programming. And software was actually going to be the reason why you were good at this.

SID AHL: So, how much of a risk is it we say in Ethereum or Solana if we move to proof-of-stake? And there are a number of people that have a really large percentage of the tokens outstanding? What could they do and at what level of concentration would you worry about?

JOE LALLOUZ: I'll also say that they could ruin the blockchain. I know that's very abstracted non-specific. But the reality is there's a lot of things that they could do. If you had control, consensus control, over Ethereum or over any of these blockchains, you could reorder the ledger in a very simple sort of simple concept. I could basically take all the money that's on the ledger and give it to myself.

Now, the reality is if I did that, the ledger would lose its intrinsic value. And I would ruin the money that I had just given to myself because no one would accept it. So, it's a bit of a catch-22 scenario. So, I like to say they could ruin it in a sense that let's just say I wanted to ruin Ethereum, not get money. But I wanted to ruin it. And I was okay spending a trillion dollars doing that. I could do that. I could buy as much Ethereum as I possibly could and then reorder the ledger, make everybody lose trust in it, and no one would use it. And the whole thing would fall apart. That would suck. So, that's a pretty big existential risk.

Now, I think people erroneously look at it as, "Oh, I could make changes and make decisions and no one would notice." But blockchains are public. If stuff starts happening that's very weird in a blockchain, lots of people notice. People notice when blocks aren't being formed because it's completely public, and this has actually happened recently. You see of the sort of smaller or maybe not a successful chains that don't have as much decentralization. We've seen examples where they're getting either attacked in some way or someone is trying to change the consensus, and it's very obvious. And you see it on Twitter, and you see it in the forums of these blockchains.

So, someone could ruin the blockchain. They could ruin the trust. They could ruin the ecosystem around it. As blockchains get bigger, what we call token distribution so, the amount of assets that are being held or concentrated around any single individual does tend to spread out which is a good thing because it's used more. Transactions are happening more.

And so, it gets spread around which means that risk becomes lower and lower. So, it's not nothing. I mean the younger the blockchain, the higher that risk is which is both can be dangerous, but also can be a good thing. So, in an early parts of a blockchain's lifespan, having a very dedicated concentrated founding team that actually has the ability to affect consensus is super valuable because they didn't start the thing to break it.

They started it because they wanted to see it be successful, and in the early days, when they could in theory reorder the chain because they have so much concentration around these tokens, they're choosing not to which is a good thing because they don't want to. And so, it's actually helpful.

SID AHL: All right, Joe. Let's talk about ESG. Then, as we're talking about proof-of-work to proof-of-stake, and there's some statistics out there that say that energy usage going to proof-of-stake is reduced for Ethereum, say, by 99%. And so, obviously that's one of the things people talk about with regard to the environmental footprint. It's also been some news of environmentally friendly blockchains like TSIA coming out. Just what's your view on the ESG considerations in space?

JOE LALLOUZ: I think that the shift from proof-of-work to proof-of-stake certainly has positive environmental impact, will have a positive effect on the environment from blockchain maintenance and block production perspective, and that's a good thing. We're happy to be a part of that. I mentioned that before you don't need the specialized hardware for mining the chains, and that hardware does take up quite a bit of power.

I do think that there's a bit of an overreaction specifically on the Bitcoin side of things. It's actually funny. So, my co-founder and I, one of the first things we did was we actually built a mining facility. Not a lot of people have built a proof-of-work mine. So, they don't know the process that goes into this. An actual data center in the middle of nowhere. So, two things that are important about this.

The first thing is that when we built a proof-of-work mine, we actually stopped and said to ourselves, "We refuse to do this unless we're going to do it in a renewable fashion." And so, we only looked at renewable energy to support this. What we realized in doing that is that renewables are actually one of the only ways to do it because it's one of the only economically feasible ways to do it.

So, there are obviously some sites that are using things like natural gas. And famously, we hear a lot of rhetoric around like, "People are burning coal to make Bitcoin." I actually think that's an incredibly small chunk of the Bitcoin mining. Almost everyone that I know in the space, and obviously this is anecdotal, it's not data driven, has been focused on hydro and wind power or there's a new trend now to use. I'm trying to blank on what it's actually called, but the sort of offshoot from a gas production where you use this exhaust that would normally be exhausted into the atmosphere, and you burn it.

A little inside track for everybody. Three things you're looking for when you're trying to do proof-of-work mining, incredibly inexpensive that tends to be in areas where they have a lot of water or a lot of wind because hydro tends to be quite cheap to produce at large scale. So, you're looking for excess hydro. The second thing is a temperate environment. So, sucks to do a proof-of-work because there's a lot of heat that's produced. It sucks to do it in the desert. You actually want to do it in an area that's somewhat cold so that you don't have to spend additional energy on cooling. And this is all again economically in service of your operation.

And the third thing is you want it to be out of the way. They can be a little bit loud. They're not that nice to look at generally speaking unless you're spending a lot of money on making you look pretty which most people aren't trying to do because the margins on proof-of-work mining from a business perspective are they're not bad. You have to be pretty cognizant of what's happening.

We ended up in the Pacific Northwest in the United States. We're quiet about exactly where it is for security reasons. But it tends to be temperate. There's a lot of really great hydro power up there. And when we walked into the town, the mayor of the town that we were building this data center and was like, "This is phenomenal," we are paying people to take our power. We have so much excess power we don't know what to do with it, not getting too deep into the concepts of hydro dams. But there's a cost in starting and stopping a hydro dam.

And so, they need to be able to produce enough power and sell enough power to keep it running, and they're actually excited about us taking the excess power. It is definitely true that proof-of-stake is better for the environment. It just takes less electricity to run proof-of-stake networks which is a good thing. So, I'm glad to be in support of that. I do think that proof-of-work has a time and a place.

SID AHL: What are the biggest risks? If we're in five years talking about how the vision was not realized, is it regulatory? Is it ESG? Is it technical? What are the things that you worry about the most?

JOE LALLOUZ: I don't feel an existential threat to crypto and blockchain. I actually think that it will continuously evolve. It will continuously iterate. And if the world thinks that the environmental impact of proof-of-work is too high that we shouldn't support it, we eventually won't. It will shift away from it, and the market will decide that. Probably not as afraid of regulation as some people might be, not because I think that it's great or that I think that it's bad, but because I think that I don't think I know that crypto is a global phenomenon, and it's one of the world's largest global open-source projects.

Those projects will move to places where the regulations are more favorable, and that's an inevitability. So, I'm way more focused on the innovation side which ironically does lead me to the thing that I am worried about which is at the pace of innovation in the crypto space is breaking the speed at which something goes from PhD research to applied technology. So, it's like someone's PhD thesis. And now, it's like in production and powering tens of billions of dollars. It's just astronomically fast, unprecedented in the tech space. We haven't seen this in any major way.

And so, I'm both excited, and thrilled by that. I think it's the best thing about crypto. But it's also the probably the thing that's the scariest which is if you start to break trust too quickly, folks maybe won't jump on board, and we won't get the mass adoption as fast or as successfully as we want.

SID AHL: Looking out five 10 years from now, where do you think consumers and listeners to this are most likely to interact with a blockchain-based application? What is a potential vision looking down the road?

RIA BHUTORIA: I think that a lot of excitement that we've seen this year around decentralized finance applications, NFTs, games, and decentralized autonomous organizations that kind of organize and facilitate decisions across these applications. They will be much more prevalent in the lives of users.

I think users will be much more comfortable using DeFi. And I think we'll start to see the integration of NFTs within DeFi, the integration of DAOs. We're already starting to see that. The application of decentralized autonomous organizations onto foundations and treasuries of DeFi protocols, people are creating DAOs to invest in NFTs. And I think it's starting from the crypto native community. But NFTs especially have onboarded a set of users that might not have been as passionate about finance or as knowledgeable about finance.

But they're passionate about art. They're passionate about music. They're passionate about games. And NFTs are onboarding these users. And once they're in the ecosystem, it's relatively more trivial to hear about a DeFi protocol and be like, "Oh, let me check that out. Let me see how that works. Let me see how I can leverage this NFT token that I have within DeFi." And I think, yeah, we'll continue to see innovation across all of these different themes that are separate right now. But I think they'll be much more integrated in the future.

SID AHL: So, we're recording this in late June. The cryptocurrency market is currently in one of its kind of signature drawdowns. I think Bitcoin and Ethereum are down something like 55% from their highs. There's been some news lately of China cracking down on Bitcoin mining. And typically in these cycles, we get some traders who perhaps were leveraged taken out of their positions. What do you see going on in crypto right now? Is this kind of a typical sell-off or is anything different this time than in the past drawdowns?

RIA BHUTORIA: It's not going to be a linear path up. And I feel like we've seen a lot of fear, uncertainty, and doubt proliferating over the last few months that's just been building up. One of the criticisms against Bitcoin is that it's powered by dirty energy sources. Another criticism is that significant mining operations are located in China, and that's potentially bad for Bitcoin to the extent that they have the ability to exert control.

So, to the extent that these crackdowns cause mining operations to shift to parts of the world where they're able to leverage greener sources of electricity, of energy that's positive for Bitcoin and to the extent that they distribute themselves globally and diversify away from China, that's also really good for the decentralization and distribution of minors. Headlines like that certainly cause fear. And I think people are quicker to act on fear than they are to act on positive developments.

SID AHL: Thanks to Joe, Ash, and Ria for sharing some insights on this really interesting and complex space. To dig into some of the investment implications that we think about for our clients, I'll be back in a minute with two of my colleagues, Erika Pagel, our chief investment officer of Sustainable Investing and Ken Coe who covers financial services companies on our Equity Research team.

SID AHL: Erika, Ken, thanks so much for joining me. I feel like I've been lost in this space for months. And I am eager to have you join me and provide some additional and outside perspective on some of the issues discussed in the podcast and in your own research. So, thanks for joining.

ERIKA PAGEL: Sid, it's an absolute pleasure to be here today. I know you've absolutely immersed yourself into this space. And I'm curious as to what has surprised you the most in all of these conversations that you've had and all of the work that you've been doing in this space.

SID AHL: It's a tough question. I might have a few answers to it. But I think I'd start with just how complex and fast-paced this space is. I think a lot of people describe the experience of kind of going down a rabbit hole as they start learning more and more about blockchain and cryptocurrencies and looking at different protocols.

I think, certainly, I've realized just how important it is to have a specialist that you're partnered with to focus in this area, not just for kind of access to information and technical expertise and investment insights, but also for the operational side of owning, trading, staking these assets. And I just think it's really hard for a generalist to do well in this area. I've been really surprised at just how early it is in some of these protocols, the kind of so-called protocol wars that there's still not yet a consensus on the platform, and Ethereum is leading the way in smart contracts and decentralized applications. But still, it hasn't yet transitioned to proof-of-stake where a lot of other new platforms have set themselves up.

And so, Ethereum's at a bit of a disadvantage there. I think the talent attraction in the space has been really interesting, this kind of drain of really smart entrepreneurs and VCs come into the space. And then, I think perhaps most positively, I've been surprised by being able to find assets where there are real economics that go to token holders. And that kind of lend themselves to fundamental analysis like we typically would look to do as bottom-up investors. And I think that's where we've invested most of our time.

So, Erika, let me kick it back to you. There's so much discussion about ESG especially the environmental concerns surrounding Bitcoin and the energy intensity of proof-of-work mining. What are your views on the ESG concerns in this space? Are they overblown? Are they appropriate?

ERIKA PAGEL: Well, many of you have likely read the estimates. CO2 from processing one Bitcoin transaction is the same as 722,000 Visa transactions, or Bitcoin mining generates as much carbon dioxide as New Zealand or Switzerland, or Bitcoin uses 12 times the terawatt hours when compared to Google.

Bitcoin and mining crypto currencies has become a lucrative business. And you need a lot of computers to make it profitable. Massive warehouses around the world are filled with specialized machines that run around the clock, and they consume a lot of energy. In order to minimize operational expenditures, miners have clear incentive to optimize cooling systems and to frankly seek whatever power is available at the lowest cost.

So, today greater demand, higher crypto prices lead to more miners using increasingly powerful computers. And all of this attracts more to join the network. So, a virtuous or a vicious cycle, it really depends on your point of view. So, Sid, estimates for Bitcoin or other crypto reliance on fossil fuels versus renewables, it varies. And there's few places to find accurate, consistent data. Probably the most referenced is the University of Cambridge who estimates that Bitcoin accounts for two-thirds of the total energy consumption for crypto.

China has the most Bitcoin mining of any country as well as the largest hash rate. But what's really important is that in order to understand carbon emissions, you have to understand the sources of energy used to produce electricity. So, while some mining facilities actually disclose energy sources. Many do not. According to Cambridge's research, 39% is currently powered by renewable energy. That's mostly going to be from hydro. But 75% of miners use some form of renewable energy. So, there's a lot of hope here.

Another main challenge in determining the share of renewables in mining is the variable nature of renewables. Weather plays a very big role here. There's an example of the Sichuan province in China that the average power generation during the wet season is actually almost three times that of the dry season. So, in summary, what we do know is that the nature of mining is very energy intensive.

SID AHL: So, it's interesting, and we're recording this at a time where China has really started to crack down on mining. And there are reports that maybe 90% of Chinese miners have been forced to shut down operations or

move next door to Kazakhstan. Tesla's had a really public 180 on this buying Bitcoin on the balance sheet, accepting Bitcoin for purchases of Teslas and then backtracking and citing the environmental concerns.

KEN COE: Well, Sid, I'd point out one thing too is that there's companies that we actually have invested in that have bought Bitcoin on balance sheets. I'm thinking Square has really very consistently from the beginning talked about Bitcoin ultimately and crypto becoming more clean energy. And they actually announced the launching of a Bitcoin Clean Energy Investment Initiative which ultimately should be aimed at making crypto mining and Bitcoin mining eco-friendly.

ERIKA PAGEL: I think that's right. Bitcoin miners, they have a constant energy requirement. So, they will not be switched off either until it breaks down or it becomes unable to mine at a profit. And so, until renewable energy can actually be stored and run 24/7, there will probably be an energy mix. But there's been a lot of progress.

And so, the second largest cryptocurrency, Ether, is right now switching to proof-of-stake, a new mechanism that is going to be much less energy dependent. It's going to take time. They're making this switch in stages and the industry is actually calling this mining 2.0, and there's been a lot of other progress out there. So, there's the Crypto Climate Accord which is actually supported by the UN. They're working to ensure that the industry moves to 100% renewables by 2025.

And Ken brings up a really good point. More voices on the public company side are having much more relevance today. And Tesla is one of them. They're not going to accept Bitcoin as a form of payment to purchase cars due to climate concerns. They could potentially change their mind if this does become more energy efficient.

Square is another great example. There's still a lot of work to be done. Cryptocurrency would benefit from more transparency reporting on energy usage carefully differentiating between energy-hungry algorithms and energy-efficient algorithms. And I think more will likely make the switch to less energy-intensive mechanisms. And then, lastly, mining can take place anywhere. Miners could demand the most efficient hardware going forward.

KEN COE: There's also an interesting aspect here as we talk about reduced energy demand or energy consumption with respect to crypto and blockchain technology. On the semiconductor side if I think about our investments in the semiconductor space, there's almost a pro and a con to this. The first is that if you think about it, as Erika you pointed out, if Ethereum moves to proof-of-stake from proof-of-work, GPU demand will go down. And that will theoretically create a drag on revenue growth for some of our investments in the semiconductor space like NVIDIA, for instance.

But on the other side and more fundamentally speaking, the increased demand we've seen from miners has actually taken business away from their core target which is the gamer. So, lower supply, higher prices, or both can cause them to lose a customer that could or would have come back multiple times over the coming years. There are pros and cons to some of our investments from the reduced energy consumption.

SID AHL: Erika, what do you make of the kind of social positives to Bitcoin or other cryptocurrencies? How does that factor into the total ESG picture?

ERIKA PAGEL: So, there is potential here or potential with digital assets as this really starts to move forward. The thought that Bitcoin could democratize financial markets by essentially removing intermediaries, it could have social prospects. We've all read that it could result in greater financial inclusion, promoting human rights, and unlock economic participation. And this is particularly critical for those that have been either left out or underserved by today's infrastructure.

So, the attraction is crypto allows anyone with internet access to potentially escape from an unreliable national monetary system. Another benefit is that crypto transactions are largely transparent and traceable. But it's really important to note that even if one can access crypto currencies, there's a great potential for severe price reaction and volatility which could make this investment not suitable for everyone and not a cash alternative. And the regulatory landscape is shifting very fast.

And what we do expect is more regulation is likely. Regulators are coping with crypto's reputation as a medium for illicit activities. And in many ways, the regulatory system is being tested. It's a balancing act protecting consumers, ensuring that the market has integrity while promoting innovation. And there, we talked earlier there's a lot of countries that are already implementing bans, and they are probably looking to curb the speculative nature of trading crypto to avoid financial risks. So, there needs to be more regulatory clarity and more clarity of definitions.

SID AHL: So, Ken, let me kick it back to you and just ask how are you seeing this play out in some of the public companies? You already referenced how this could be impacting some of the semiconductor companies. I'm particularly interested in what's going on in fintech and payments companies that were invested in? Where are the opportunities here? And do you see the potential risks as well as outlined by some that I spoke to over the course of these conversations?

KEN COE: So, I think it was Joe talking about how crypto allows for the elimination of a tremendous amount of intermediaries that require lots of extra fees, barriers, middlemen, et cetera. I think really the same can be said for distributed ledger technology in general. So, look at our investment in Visa, for instance. They've commercialized or recently commercialized a product called B2B Connect. It's a cross-border business-to-business payments product that uses distributed ledger technology to quickly send cross-border payments that have historically relied on a very slow, very expensive, very archaic correspondent banking system.

So, this represents a new payment flow that we're really excited about over the coming years that supplements the core consumer to business payments business really nicely. Even with respect to crypto itself, it's interesting to watch our investments in Visa and MasterCard and how they're thinking about crypto. So, to the extent crypto stays as a store of value, Visa and MasterCard will look to partner with companies like Coinbase and do things like issue a Coinbase debit card which can be used at the point of sale. And at which point, your Coinbase balance will be immediately converted into fiat at the point of sale. To the extent crypto becomes a legitimate currency, they'll just simply add it to the list of 150-plus currencies that they support.

As I've listened to these conversations, I've also gotten really excited about other companies we own like PayPal and Square. Both companies have digital wallets that allow users to buy, sell, hold, transfer, even spend crypto. So, while crypto itself is actually not a large profit driver for these companies, it's a phenomenal customer acquisition tool that brings users into the ecosystem that can be monetized in different ways.

So, this provides a great upside optionality to some of these companies and the monetization of these wallets. You all talked about crypto and blockchain technology in various industries and touched on finance. I think our investment in JPMorgan which now actually has a unit called Onyx that is dedicated to blockchain technology applications and digital currencies like the JPM coin are very interesting.

So, this coin by the way, it's a fiat-backed stablecoin that has recently become or recently became commercially available. And in October, they signed their first large client, a large multinational technology company. It's best been described essentially as JPMorgan's corporate clients holding their US dollar deposit accounts on a blockchain account. And it can power things like security settlement. But there's other exciting applications here that I think a lot of people haven't really seen yet like the programmability where you can actually program the money for conditional payments, things like tax assessments that are very rules-based, but have historically required very specific instructions to be sent to a bank like JPMorgan.

SID AHL: You're charting a path where some of the incumbent fintech and financial services companies could be adopting at a pace and kind of integrating certainly the blockchain technology and at least maybe on the enterprise set of things for, say, JPMorgan. But maybe even on the consumer side of things for a Square, be big market participants in crypto.

KEN COE: Absolutely. And as I pointed out, Square has made a pretty significant investment in Bitcoin on balance sheet. They've been very outspoken supporters of Bitcoin. Jack Dorsey has even called Bitcoin, the native currency

of the internet. So, we do think that there's absolutely applications consumer facing. There's business facing. There's enterprise facing that we're really excited to see.

So, Sid, I'd love your thought on this. After these conversations, what have you found the most compelling bull case or use case for blockchain-based applications and cryptocurrencies today?

SID AHL: It's a lot of what you just talked about in terms of the kind of 24/7 365 trading and instantaneous settlement which is really the kind of decentralized finance, this DeFi segment. I think it has huge potential right now within crypto. The ecosystem still feels pretty close to me. You're able to borrow and trade and lend all sorts of different cryptocurrencies, but that don't have a lot of linkages to the physical world. So, you can do a lot with your Bitcoin, or Ethereum, or Dogecoin or what have you.

But there's just less of the real economy that's being represented there. And so, it just feels fairly nascent. And I also still struggle with this how much of DeFi infrastructure may be created by centralized fintech companies and banks that may be more appealing to certainly like an enterprise customer who would rather interface with JPMorgan's blockchain. Obviously on the consumer side of things and for other types of users of the system, they might have different priorities. But I think DeFi is really exciting although I do also think it's likely to bring more regulatory attention. I do think the concept of having exchanges and basically banks in a fairly unregulated environment, I don't know that lasts forever.

I think gaming is really interesting I'm definitely convinced that my children will be spending a multiple of the time that I spent online, and they're going to have a much higher willingness to spend real money on digital goods. And I see a potential use case for non-fungible tokens not just in terms of the art market, but in terms of in-game purchases. But also perhaps contracts or deeds or other items that could be used in the financial system.

I'll say I'm getting closer on social. I can see the use case for monetization of an artist or a celebrity or an athlete providing access behind the scenes access or just being able to invest in people from a social perspective or exchanging value when you're liking something that somebody's put out or certainly the idea of paying in cryptocurrency for access to your favorite writers online. A lot of this is developing really quickly. And I think it is interesting. But again very early stage.

ERIKA PAGEL: Sid, we've learned a lot about the promise and potential opportunity in the cryptocurrency market. But we've also learned a lot about the meaningful risks. How are you advising clients to approach the space from an investment perspective?

SID AHL: The first thing I'd remind people of is that we already have some exposure to blockchain technology through public payments and financials companies, and our venture capital investments. And I think the next thing I recommend people understanding is the big difference between Bitcoin and Ethereum, and its ecosystem or really much of the rest of the cryptocurrency market. It's kind of apples and oranges in my view. And I'm ignoring here the various dog coins and meme tokens that I tell anyone to stay away from.

I think Bitcoin's kind of more of a macro asset. It has no real fundamental value. It's the same as gold or fiat currency in that way. And as such, I kind of struggled to use it in portfolios as a bottom-up investor. I like cash flows however distant they may be. And Bitcoin has none. I probably come to appreciate its appeal to speculators and those concerned with runaway inflation. I haven't recommended positions in Bitcoin although I can say I also haven't recommended positions in things like gold. It may be a great speculation. But I'm kind of okay being on the sidelines.

I'm more interested in the opportunities outside of Bitcoin, the protocols powering the nascent DeFi areas and potential use cases in gaming and social. And I'm also interested in the companies providing services to that growing ecosystem. We've had a good amount of exposure already to the service providers through our VC managers, many of whom have invested in exchanges like Coinbase and Kraken. And we've also begun investing in some crypto specialist managers like the strategy Chris Dixon leads at Andreessen Horowitz this gives us exposure to specific blockchain projects in DeFi and gaming in other areas

Just say a calling card of the crypto industry is do your own research. I'd recommend any client interested in looking at the space take some time to understand it before considering any investment. I also remind anybody of the unique investment and operational risks here. So, the sizing should be kept quite small and focused on allocating capital to the real experts, the access, technical knowledge, operational expertise, all these are invaluable in this area. It's a really inefficient space dominated by retail investors where professionals should be able to generate pretty meaningful out performance in my view.

So, we focus primarily on private venture capital-oriented strategies focused on the long-term potential of the space. Hopefully, that can also help us prevent some of the behavioral pitfalls of investing in a space this volatile, so, the selling at the bottom and buying at the top. So, I guess overall, keep it small. Take it slow. Do your own research and partner with specialists and only invest what you'd be comfortable potentially losing. Erika, Ken, thanks so much for being here today.

KEN COE: Glad to be here. Thanks for having me.

ERIKA PAGEL: Sid, thanks for having me. This was a great conversation.

KEN STUZIN: Thank you for joining us. As we close out season two of the NOW Podcast, we look forward to launching season three this fall as we continue this effort to seek out insights that help us understand a rapidly evolving world. If you enjoyed listening, we encourage you to subscribe to the podcast. Until then, be well, stay safe and, finally, have a terrific summer.