00:00:00,000 --> 00:00:02,720
Alex Watkins
- Are we spending too much time and focus on AI?

00:00:02,720
Tony Kim
- It is insatiable demand, and there's still a shortage. If you don't do it you become irrelevant.
00:00:09,560
It's the wild west and it's a security nightmare. But it is a peak into what is the possible.
00:00:14,360
But if you operate in space it's free energy.

00:00:16,360 --> 00:00:18,560
Alex Watkins
- Free, non-intermittent energy.

00:00:18,560 --> 00:00:19,480
Alex Miller
- That's huge.

00:00:19,480
Tony Kim
- Multiple breakthrough technologies, all by 2023.

00:00:22,320
Alex Miller
00:00:22,320
- True exponential change, on multiple levels.

00:00:24,800
Alex Watkins
00:00:24,800
- Turns out that the movies from the 90s weren't that far wrong.

00:00:29,960
(upbeat music continues)
Alex Miller
In this episode, I'm delighted to be joined by two distinguished guests as we talk about all things AI and more in technology.
00:00:37,520
Firstly, we have Tony Kim from BlackRock, who runs the global technology team there, and we also have Alex Watkins from Citigroup in the Investment Banking Division who runs global capital markets technology.
00:00:48,840
So without further ado, maybe we can just jump straight in. Tony, maybe I can give you a couple of rapid fire questions just to get things kicked off.
00:00:56,040
AI's in our lives in many different ways. What's the most useful thing that AI's done for you so far?

00:01:02,240
Tony Kim
I like currently using it to aggregate, disparate ideas. So something that might have connectivity.
So I ask a deep research question on, let's say energy, and then equate that to compute, and then put it in a dimension of time and a timeline.

00:01:27,480
So like multi-variable composition, and then you look at very, things that might not be obvious to connect them together.

00:01:37,040
Alex Miller - Host
What's the one thing you think AI might struggle to replace?

00:01:40,880
Tony Kim
Does it have novelty for a new idea, a breakthrough idea? If you imagine if it was the world year 1904 and there was AI and it was trained on all the data from until 1904, could that AI have come up with a theory of special relativity in 1905?
00:02:02,600
It's the year 1970 or '76 and Star Wars comes out in '77. Could it have come up with that original screenplay? And these kinds of ideas are today, can it solve the theory of quantum gravity?
00:02:18,200
That kind of novelty new breakthrough ideas, I'm not sure that's capable right now, but I think, but we'll see in the next few years, if it can really bring that novelty of new invention versus task automation and various things I think which you can absolutely do.

00:02:39,200
Alex Miller - Host
That breakthrough in originality.

00:02:40,280
Tony Kim
The breakthrough in originality, that very tip of the spear, if you will, of invention of that's still that human capability.

00:02:48,760
Alex Miller - Host
Maybe just give us a sense of your journey to today. Were you destined to be a technology investor, do you think?

00:02:55,640
Tony Kim
No. I grew up in the Midwest of the United States. I studied, went to engineering. I didn't, I realized that wasn't really my calling. I wanted something much more strategic.
00:03:10,040
And the investment role kind of married what I think is my core strengths, I guess. but, you know, I've always had an interest in technology maybe because of the engineering, but also serendipity of being in California.

00:03:30,200
Alex Miller - Host
And remind us today what your role is at BlackRock and, and what you're responsible for.

00:03:33,440
Tony Kim
I lead the investments technology side. I invest globally across the, the entire value chain of technology, which is like now almost half the market of the market cap of the world.

00:03:48,520
Alex Miller - Host

Alex, maybe I could ask you to introduce your role here at Citi and perhaps your journey of late as well.

00:03:54,200
Alex Watkins
So I'm Global Head of the Technology Capital Markets Businesses, that's equity, debt, stuff in between, that's asset-level financing, so data centers, contracts, GPUs. So really right place, right time. You know, tech continues to grow as a proportion of GDP and, and the companies are getting significantly more capital-intensive, so lots to do.

00:04:11,840
Alex Miller - Host
Tony, if I can sort of turn to you, you've described AI as an Intelligence Revolution-that is arguably the single biggest changer and driver of growth going forward.

94
00:04:21,840
Tony Kim
I laid out a framework three years ago when I first started and I just followed that framework. To Intelligence Revolutions but to manufacture the intelligence, you start at the bottom, and I just call that the entire infrastructure - complex.
00:04:42,800
This is also what I call atoms, atoms versus electrons, okay? And, so at the very, very base layer is energy or power. it's necessity to then run the compute, the chips, and then those chips are then housed in a data center. Those three is the infrastructure. They are 100% linked. It is 100% correlated because you need the power to drive the chips, the chips to then give birth to the models.
00:05:18,640
And so that base layer is pulling in the plurality of the current investment. That layer then gives birth to the intelligence layer. This is the model and I would also put it in here, like the data fabric.
00:05:35,360
And intelligence is scaling based on the scaling of the compute. And there's a, also one-to-one correlation of scaling the compute, scaling the intelligence. Now, at that model layer, but that layer is actually having a big implication at the top layer, the top layer being software and labor services.
00:06:08,200
So a lot of electrons up here, so you got physical system, physical layer of the building of the AI and running the AI, and then the top layer is software is in electrons. The model itself is a bunch of electrons.
00:06:24,320
And then at the very, very top is labor itself. And, what you're seeing is now as these, this intelligence gets more and more capable, the first few years, it's been at least 10X, one order of magnitude capability, 10 times 10 times 10, you know? That's 1,000-X.
00:06:43,520
If you keep compounding at that, in five years, it's 100,000-X, right? So, and that's one question. So then what, if that intelligence capability is compounding at one order of magnitude a year, roughly, what then happens to the application and services layer?
00:07:03,680
That is the basic framework. And then companies are slotted in this framework. The interesting thing is that, that base foundation layer, most of the market cap and the power, if you will, was never at that layer. It was always at the top and still probably to this day, the market cap is still in there, but you're seeing a big shift.
00:07:25,360
It's really pushed this shift down to this, this base layer of intelligence, which is, in my opinion grabbing value from the application layer and the services into the intelligence and for the intelligence to basically live, you need this base infrastructure layer.

00:07:47,000
Alex Miller - Host

So there's a real fundamental shift happening-

00:07:49,880
Tony Kim
Absolutely. Absolutely.

Alex Miller - Host
... in terms of how not just investors, but presumably countries as well are thinking about the stack in their country and what they have access to.

00:07:58,640
Tony Kim
Yeah. And that's why you hear sovereign AI and build these data centers everywhere, et cetera, et cetera. The other thing about the intelligence layer, it democratizes this kind of knowledge to all countries, actually.
00:08:15,120
So, if you kind of roll this forward, if you have the intelligence of super intelligence or Einsteinian level of intelligence to all people, regardless of your wealth or, there is a democratization happening of that level. And this is why a lot of companies are investing in that base layer, the physical layer.

00:08:38,360
Alex Miller - Host
And, and given so much is happening and across these layers as you described them, what's the framework that you have? Is it around-
00:08:43,800
... strategic moats? Is it the rate of change?

00:08:47,880
Tony Kim
So there's another dimension of time. So there's this vertical dimension of this stack, this three-layer stack. I think I kind of described it where you're seeing movement amongst the stack where I think value is initially being accrued. The next is time because these last three years have been about infrastructure.
00:09:07,120
The next couple years will still be about infrastructure and yet, so you need to build this base capability. As this capability is being built, there's then the diffusion of this capability to the average person. And there's big, big lag. What is happening at the state of the art, the capabilities at the state of the art versus what your mother, my mother, my cousin, your cousin-

00:09:40,800
Alex Miller - Host
And in the enterprise context is what we're hearing a lot about that…

Tony Kim
… is multiple years behind the capabilities.
00:09:48,360
And so for the first few years, it's all been about the infrastructure, and this will continue?

00:09:53,000
Alex Miller - Host
The build-out.

Tony Kim
The build-out, the build-out, the build-out. And still more build-out.

00:09:56,240
Alex Miller - Host
Hence the debate about CapEx.

00:09:57,920
Tony Kim
Hence, the debate. But the thing... yeah, we can talk about that relative to bubbles, but it is insatiable demand, and there's still a shortage. That said, there is a big gap between what these models are capable of and what you're actually using them for.
00:10:16,600
And so every year, I'm not sure the gap closes, but what was state of the art today in a year becomes average which gets adopted. And so, so there's this dimension of like, it's lagging the capabilities, but eventually, it gets diffused - more and more diffusion. And like, I don't know, we're sitting on Monday here, over the, over the weekend, this Claude bot, which became Moltbot, which is now…

00:10:49,120
Alex Miller - Host
Yes.

Tony Kim
... OpenClaw has taken the world by storm, or at least the internet world by storm. This is kind of like-

Alex Miller - Host
Agents talking to agents.
Glimpses of the future…

00:10:58,720
Tony Kim
Glimpse. These are glimpses. These are glimpses. I mean, it, it is, it's the Wild West and it's a security nightmare, but it is a peek into what is the possible, the art of the possible.

00:11:08,000
Alex Miller - Host
I'm presuming, Alex, you're seeing a whole host of interest from across the whole technology space in terms of funding a lot of these changes that we're seeing in the market.

00:11:17,360
Alex Watkins
Yeah, I think it's interesting. I mean, I think if you, if you decompose the market, you know, you've got the Magnificent Seven. So if you look at Magnificent Seven, they actually have the capacity to fund this and potentially do other things. I think semiconductors, the companies have been generating so much cash, again, their need for financing is probably lower. Elsewhere in the stack, as I think Tony says, if you look at the folk that are building the infrastructure, the people that are developing the models, I think that's where the capital intensity comes.
So yes, it's probably not going to come universally.

00:11:47,120
Alex Miller - Host
This is fascinating. And maybe just that, that glimpse into the future that you mentioned, it feels like every week, every month there's some new paradigm that's being hinted at. Is there a historical precedent we could look at going back the last 30, 40 years that would give us a parallel as to where we are?
00:12:02,960

Are we in 1972 in the Stanford Labs as the internet's being kind of you know, finally brought to commercialization? Is there a comparable moment that helps us understand where we are today or is it such a unique moment that, that there is no precedent?

00:12:18,480
Tony Kim
Is it comparable to early internet era? I mean, browser, Netscape browser kind of opens the imagination of what is possible…

00:12:29,240
Alex Miller - Host
Early '90s.

Tony Kim
Another would be iPhone one.

00:12:35,080
Alex Miller - Host
That moment.

00:12:35,960
Tony Kim
When iPhone one came out, remember the most, it was WAP. Well, before those like, WAP browsers on phones, iPhone came out and it was like a flashlight, like a, you know, email. Those were kind of the, wow, the imagination of the possible, and, you know, who knew all the applications that came thereafter? You know, maybe it's not the iPhone flashlight moment, but this lens into the art of the possible with these agents,
00:13:09,720
I think there's this assumption that AI is just like these tools that are wielded by us versus like, what if they are taking on more and more agency is what they call them, agents, right, and they have their own capabilities and then they take on more tasks. And so then AI becomes more like work, or workers.

00:13:32,080
Alex Miller - Host
It's that notion that we should think of agents as fellow employees essentially.

Tony Kim
Or, you know, in Blade Runner…

00:13:38,480
Alex Miller - Host
Yes.

Tony Kim
... you know, replicates, you know.

00:13:40,840
Alex Miller - Host
And presumably the enterprises who many of your investing companies are serving, they're thinking about workflows and how to agentify those workflows…

Tony Kim
Exactly.

00:13:49,880
Alex Miller - Host
... but that's still very early, isn't it?

00:13:51,560
Tony Kim
Still early. Still early. I mean, you should ask your audience. How many of you are today, what you're doing, do you have agents working with you or working for you? Just that simple questions.
Like, do you have an agent doing certain tasks for you? What is work, right? Work is a series of tasks. If you were to break up all the tasks that make up your job or your work, then you say, "How many of those tasks are performed by agents?"

00:14:19,880
Alex Miller - Host
Yes.

Tony Kim
I would say near zero for the most, for most people.

00:14:25,720
Alex Miller - Host
Oh, yes. Yeah. That's the fascinating bit, isn't it?

Tony Kim
Yeah.

00:14:28,520
Alex Watkins
By the way, coming back to Tony's point on the iPhone moment, I think a lot of investors will say to me, there's this debate, are we spending too much time and focus on AI? But if you liken it to iPhone one, the point is every minute you spent thinking about something else as a trend at the time, every, and there was, there was the need to look at a lot of other tech, was potentially a wasted minute.
There's going to be so much opportunity coming out of AI. It should be people's dominant focus and it's why it is the dominant conversation we're having.

00:14:56,360
Tony Kim
When we look back 20-some years at, was it 2007?

Alex Miller - Host
Yes.

00:15:00,800
Tony Kim
So, yeah, 19 years later, how many mobile operating systems are there in the world? There's two.
And it all collapsed onto those two platforms, the iOS and Android platforms. And then, where did the value accrue? It accrued to the few that were betting on that.
And, I think in many respects, that's will happen here. And, if you don't do it, you become irrelevant. So you have to do it, it is existential, in my opinion.

00:15:39,280
Alex Miller - Host

It's fascinating that our colleagues in Citi research led by Keith …they've looked at the global labor market, which they've estimated to be a $60 trillion market.

00:15:49,160
Tony Kim
Exactly. That's exactly right.

00:15:52,280
Alex Watkins
Of which 18 trillion's in the US alone, right?

00:15:54,680
Tony Kim
Yeah. I, I looked at these numbers too, 110 trillion global GDP.

Alex Watkins
Yes.

00:15:59,120
Tony Kim
Tech, if you add it all up, is 10, 60-plus is labor, and the rest are goods and capital and all these other things and for the entirety of my career, tech has been, it went from something to 10, it went to five to 10 or whatever.
But with AI, they're going after the other 100. And, and that's the prize, right? That is the prize. And then that engenders a whole cascade of conversation. What happens to that, that part of the economy?
00:16:39,400
Is there an offset when we talk about productivity and these gains? If you look at the composition of GDP in the world through world history, you know, I love history.
So you look at time of ancient Rome, zero AD, it's probably 90, 95% agriculture, and then the labor was supporting the agriculture industry. By the time of the Industrial Revolution, the 1920s, as opposed to right after the Industrial Revolution, you know, I think labor wages were maybe 25% of GDP.
00:17:13,640
Agriculture had come way down still. And then today, agriculture is 1 or 2% of GDP, but labor is, like you said, 65% of GDP. But it wasn't always that way. And so then we go look forward into the future with these, the agents, AI that are capable, what will the new composition be?

00:17:35,840
Alex Watkins
And globally, the technology's become 20% of the world stock market. It's 35% of the US stock market. If you've got so much more of the world's GDP accessible to tech, the question is, where does that percentage go as well?

00:17:48,520
Alex Miller - Host
And that's always the debate. What is the total investible market?

00:17:50,840
Tony Kim
Well, I would also say, Alex, it's 35% of tech, but they don't count comm services which is another 25%.

Alex Miller - Host
So where do you define the boundary?

00:18:02,440
Tony Kim

In general, I roughly think it's roughly half of the market cap now. But, but this goes to this point of it's my own ideas of what is that composition of labor, goods, capital, where the productivity shows up? Is it a net reduction of GDP or is it, I think many would suggest the abundance theory that it's actually going to kick up GDP growth, but it's going to look different than the current composition.

00:18:37,000
Alex Miller - Host
And that's the key point, isn't it? So we've talked there about the impact potentially to the labor market, sat here on, you know, on earth, but obviously space is an area where there's a lot of interest, a lot of companies developing, you know, new solutions, or governments looking to, you know, take control of space. How do you see how AI maybe morphs into that domain and the opportunity set?

00:19:01,520
Tony Kim
I like to deconstruct.

00:19:03,000
Alex Miller - Host
Yes.

Tony Kim
So, so what is a data center? A data center is, on earth, a building fed with a lot of power, and that power could be from solar, it could be from mostly natural gas, a little bit of nukes, running a bunch of chips.

00:19:21,880
Alex Miller - Host
A mix of energy sources running the chips.

Tony Kim
Running the chips.
00:19:23,120
And roughly right now, it's 50 billion a gigawatt, 50 billion a gigawatt. A gigawatt's a small city and really the big problem here is the permitting, the land, the supply chain, getting this in.Plugging it on…

Alex Watkins
No one wants it in their state or their country.

00:19:42,120
Tony Kim
No one wants it.
No one wants it in their back…

Alex Miller - Host
Not in my backyard.

00:19:43,880
Tony Kim
Not in your backyard, right?

Alex Miller - Host
NIMBY.

00:19:45,080

Tony Kim
So if you move into space, then, what's the difference? Well, the chips are the chips, and that's probably two thirds of the cost. So the CapEx is not going to be radically different. The big difference is, you know, you got to get it into space.
So launch becomes a foundation. You must have launched to get the payload, the weight into space.
So assuming that companies like SpaceX and others have solved launch or on the precipice of solving launch at scale, you can get these things into the orbit.
00:20:23,680
And then once in orbit ... But let's say roughly, this is my own mental math, the cost of getting a thing in space or building it on earth, the chips are roughly, it's not like a huge asymmetric advantage. It's then the operating. Well, if you operate a data centre on earth, you're paying lots to the electric, it drives electricity prices for everybody. But you operate in space, it's free energy. Free energy.

00:20:56,720
Alex Miller - Host
That's huge.

00:20:57,560
Tony Kim
Because the thing called the fusion, fusion reactor of the sun.

00:21:01,120
Alex Watkins
Free and non-intermittent energy.

00:21:03,640
Tony Kim
And then if you find the sun synchronous orbit and you get 24 hours at the right orbit, it's constant and it is multiple, multiple times more efficient up there than down here. And so then you say, "Well, okay, free energy. We can run all this compute. It's not next to your house in Northern London." That's not bad.
So logic and the physics of it suggests that this is possible. Obviously the key, the key is to get them to space, which goes to launch.

00:21:36,920
Alex Watkins
And potentially maintenance in space, right? So, you know, more hostile environment, and I think this is where AI has got a potential another addressable market, that if space does open up as a sector, who and what will be performing the maintenance and development up in space.

00:21:51,920
Alex Miller - Host
The whole new ecosystem emerges.

00:21:54,320
Tony Kim
Physical AI.

00:21:54,840
Alex Miller - Host
The manifestation of it.

Tony Kim

That's it. Exactly. Yes. Which also has that big impact on the structure of GDP.
00:22:03,000
You know, there is something else I will say that it sounds so, so negative and Draconian. I'm from Korea and we have the lowest birth rate. My people have the lowest birth rate in the world. Japan, China, Europe, you know…

00:22:22,320
Alex Miller - Host
Those rates have come down.

00:22:23,200
Tony Kim
You know, so there is…

Alex Watkins
Even the US X-immigration, right?

Tony Kim
Declining population.
00:22:27,000
And so you could also make the case that, well, we need the AI to help in the de-population.

00:22:34,880
Alex Miller - Host
So this is a government's thinking long term about population declines…

Tony Kim
I don't know if governments are thinking about it, but I think this is the…that is the reality, actually.

00:22:43,800
Alex Miller - Host
And I guess maybe when you, you talk there about obviously AI is software, but AI is physical hardware as well in terms of the humanoid and robotic revolution. When you're looking at sort of, you know, all the different sectors, companies you can invest in... how much are you looking to find companies that I guess sort of benefit from these joint tailwinds?

Tony Kim
Remember that three layer stack?

Alex Miller - Host
Yes.

00:23:06,400
Tony Kim
What's happening is and this goes to the question of moats. Moats actually, you know, going back to ancient, history, is you sit, you hang back in a castle and you defend so that's where the term moat came in.

00:23:21,400
Alex Miller - Host
Defense will …

Tony Kim
…but really a moat is not about defense.
00:23:28,520

A moat is more about offense, in my opinion.The best defense is offense, okay? There are lots of companies that are just absolutely vulnerable and we've seen it the last couple of years. Services based businesses, labor, heavily labor and software, add electrons. The moats that were perceived to have been the moat of tech for my entire career was software was the moat.

00:23:57,840
Alex Miller - Host
Yeah.

Tony Kim
Software ate the world.
00:24:00,240
So, is, is that Marc Andreessen?

Alex Miller - Host
That was the phrase.

00:24:01,760
Tony Kim
Yeah, Marc Andreessen coined it but no longer because AI has eaten that moat, they're just eaten it. And so you now question the very moat that has been the mantra of the digital age.

00:24:21,040
Alex Watkins
I guess for companies to, you know, thrive and survive, we're actually talking about, we're no longer talking about tools because I think tools alone won't work. I think you have to talk about the entire task, the entire workflow, the entire activity.

00:24:33,680
Alex Miller - Host
So everything's being reconsidered.

00:24:35,120
Tony Kim
And that goes to this thing of physical. So if the software you thought was all the moat and that's getting, and the models are getting more and more capable, and for those models to function you need this compute infrastructure, then where's the moat?
00:24:52,840
Is it in the software itself or is it, it's more abstract? Now it's, you need the compute and the intelligence, and then you pack that into a robot. And guess what, guess where moats come, you know, there's the other kinds of moats.Well, to build a robot, you need manufacturing. Atoms. And you need scale, you need metal, and you need to make millions of these things, and like how many companies can do that, and then you got to finance it all. And so even though this intelligence is, you know, but it's being packed into something like a robot, or a car, or a rocket, and so the moats get moved, a moat that is just an electron moat, moats based on electrons maybe are gone, because the AI can just generate those electrons.
00:25:42,920
But electrons may be packaged with something else like a robot, maybe that's more of a sense of moat…

00:25:49,760
Alex Watkins
Interestingly in tech, I think people never used to talk about costs. People used to talk about market position, innovation, these kinds of things as the moat. I think now in certain areas of tech, being the lowest cost marginal producer will be the folk that win. Not universally. So obviously in chip design, that's an innovation-led, scale-led

game, but in certain parts of the market infrastructure, it's going to be who can build the lowest cost compute, simple.

00:26:16,600
Alex Miller - Host
So to create scale whilst consistently innovating as well.

00:26:20,480
Alex Watkins
Lowest cost marginal producer.

00:26:22,640
Alex Miller - Host
Tony, you've given us a glimpse of what the future looks like. You also mentioned time as an important factor.

00:26:28,520
Tony Kim
Yes.

00:26:29,360
Alex Miller - Host
Many people haven't seen a humanoid except perhaps on YouTube or some video. When do you think this begins to come into people's visible lives? Or is this something that sort of remains in the markets, but doesn't come into people's visible lives for a few years yet?

00:26:45,920
Tony Kim
When they talk about humanoids, if we diverge for a second, everyone's talking about doing the dishes, picking up the groceries and physical tasks which of course you have to nail. And that motor function I think that will be solved by…

00:27:04,160
Alex Miller - Host
Care home assist, yes.

00:27:06,040
Tony Kim
It's not so much about the motor function of doing the dishes. I think it's much more about companionship.

00:27:12,200
Alex Miller - Host
The loneliness economy?

Tony Kim
The loneliness, yeah.
00:27:16,360
And or working in nursing homes, you know, you know, I think that could be a tremendous application.
00:27:21,720
I could see things like that show up but I think in general, like robotics, you will start to see that by, by 2030, you'll start to see some of that.

00:27:30,240
Alex Miller - Host

And you're beginning to see it in restaurants, you know, rather than being served or automated cleaners in airports and the like.

00:27:36,320
Tony Kim
And then space, we'll have that by 2030. I think we'll have quantum computing scaled by 2030. I think we'll see you know, will we see the first of the SMR, small reactors? I mean, you could see a lot of things and then, you know an AGI system, you could see multiple breakthrough technologies all by 2030.

00:28:01,080
Alex Miller - Host
And I guess that's the point is that it's not one single breakthrough, it feels like we're living in an era of true exponential change on multiple levels.

00:28:09,480
Alex Watkins
Multiple levels.

Alex Miller - Host
We've talked about AI,
00:28:10,760
but we haven't talked about quantum, we haven't talked about blockchain, but presumably these things come together. Maybe just outside AI and maybe it's not really outside maybe it's alongside AI. What particularly excites you? Is it the nascent quantum revolution? Is it the institutionalization of blockchain technologies into digital assets? What's…

00:28:30,280
Tony Kim
I have a lot of my colleagues at our firm is spearheading the tokenization of many of these financial assets…

00:28:36,920
Alex Miller - Host
Driven by blockchains?

Tony Kim
I'm much more on the technology side.
00:28:40,720
So I spend a lot of time in the space. I spend a lot of time on the silicon, obviously the AI models and stuff. And you know, you brought up quantum and I'll say what that, what would represent is you know, for my entire career it's been classical computing. And this represents a computer for nature really, right? It is something that computes you know, nature is quantum mechanical.

00:29:07,920
Alex Miller - Host
It's not zero or ones, it's everything in between.

00:29:09,320
Tony Kim
Yeah. Yeah, exactly.
So it's a way to model, simulate nature and a classical computer cannot do that, that effectively. The other thing is, like, when you look at the current AGI systems, and this is, you throw a lot of data…

00:29:27,800

Alex Miller - Host
Artificial General Intelligence-

00:29:29,840
Tony Kim
You throw a lot of data, massive data, and then you get approximations and answers off of that data. It's learning off the data. And this is a digital, the digital world.And now it's trying to learn things in the physical world, but it's doing approximations. A quantum computer is more simulating nature itself. It's very little data. It's more the question, like…How would we simulate this cancer molecule or this new fertilizer?
00:30:07,120
So you ask it this question, but it's exponential compute. A simple small data, a very, a question to simulate, and then that computer, if it were, if it's big enough, can give you an answer.

00:30:25,400
Alex Miller - Host
Because it's got multiple orders of magnitude…

00:30:27,680
Tony Kim
Many, many, many orders of problems that no human, you know, no current classical computer could solve if we had a big enough quantum computer. But then that, the data, imagine now the output of that, that answer, you then take this data and then you can feed it right back into the classical AGI system.

00:30:44,600
Alex Miller - Host
So this is that notion of QAI, quantum AI…

00:30:47,760
Tony Kim
So you have a CPU, a GPU, a QPU, all sitting in... One doing all this AGI classical computing, another one that's doing this, what I call an exploration of nature itself, getting answers and then helping train the classical system.

00:31:05,160
Alex Watkins
And Tony, do you think we can get to general intelligence, i.e. you know, novelty, purpose... just by throwing more compute at the problem or do you think some, there needs to be another through?

00:31:14,640
Tony Kim
When you look at what Demis Hasibus says or what Dario says and others, there's a difference of opinion of what's necessary and the timeline. So some would say just it's compute and it's going to happen soon. Others would say, well, you probably need two or three more breakthroughs, and it might be longer. But like most would say within two to 10 years, either compute alone or compute plus a couple additional breakthroughs.
00:31:48,760
That's kind of the summation of where the views are of the leading AGI labs. And then on top of that, you can throw on this thing of a quantum simulator of nature, and then you add those together and then you take it to another level.

00:32:04,800
Alex Watkins
It turns out that the movies from the 90s weren't that far wrong.

00:32:07,680

Alex Miller - Host
They were pretty good predictives. I guess for a lot of our listeners, whether they're in the corporate sphere, the investor sphere or others, how to keep on top of all this is, it feels overwhelming. Do you have any advice for how you think about your frameworks to try and understand what's happening in this space?

00:32:24,120
Tony Kim
What I would do is establish a deconstructionalist mentality and then create a little framework, a framework for each thing. So say these are the seven things that are very important, space, power, chips, quantum, whatever…

00:32:44,000
Alex Miller - Host
Labor, yeah.

Tony Kim
Whatever they are, labor, okay, then you say, all right, these are the things that are most important. Create a simple framework for each one of those, deconstruct those seven things and then once you have a framework and a deconstruction, you bring in the data every day into those things.

00:33:07,200
Alex Miller - Host
Through that filter.

Tony Kim
Through that filter.
00:33:09,200
And then it gets, guess what? You know what happens? You start organizing yourself. And so then everything as this information is coming, it's coming in, into those frameworks. And then you're wiring yourself to reorganize information. So as it all comes in incrementally, it then doesn't become this like gigantic morass of things. It becomes, ah, I understand that is, this applies here.

00:33:34,440
Alex Miller - Host
Because that's the challenge, isn't it? How to make sense of things.

00:33:39,080
Tony Kim
And then time, you will get more and more comfortable, the lingua franca of each one of these things into your little framework, and then the data just becomes additive. And then that, you know, then what you'll do, it's kind of like a neural network being built. As you build that, you then build connections between these seven things.
00:34:01,120
Oh, wait, that is related to this, this is related to that. Space is really the chips, but chip is related to energy. And next thing you know, you now you've connected these things together.

00:34:10,880
Alex Watkins
I think AI basically either amplifies or marginalizes your role. So I think you want to be in the camp where AI is amplifying what you're, what you're doing. So it's allowing you to synthesize information at a speed and scale that you could never do before. So with that, you have the opportunity to anticipate trends, think more creatively. That's the impetus that it leaves on us in our jobs, right?

00:34:31,800
Alex Miller - Host

And maybe on that point, Alex, you know, when you're speaking and advising founders, CEOs about how they should position themselves for investors thinking about, you know, the AI debate and the lens through which they're looking at companies, do you have any advice that you would, you would share?

00:34:48,000
Alex Watkins
I think you're either in two camps. You're either in a part of the value chain where you need to demonstrate why you're going to get to the lowest cost marginal producer, that's sort of part of the AI ecosystem. Or you're in the part where what you're selling is you are innovation led with a tremendous moat and a moat that's self-reinforcing is you make further breakthroughs on that.

00:35:07,280
Alex Miller - Host
I'm being super clear about that.

00:35:08,080
Alex Watkins
So I think that it's almost a polarizing spectrum of investment opportunities now, and you need to tell your story along those lines.

00:35:14,560
Alex Miller - Host
And then picking that up, Tony, you mentioned in your early comments about the morphing or the graying of the lines between public and private markets. And obviously so much of the innovation today is happening in private markets at some point, some of these companies may come public. How do you as an investor and perhaps more broadly, you know, BlackRock as a firm, think about that continuum for companies in their lifecycle and how to capture the true gains that sit out there?

00:35:43,440
Tony Kim
Probably and private is in some respects, the companies are the companies. What's the difference? Except that one is liquid and non-opaque and this, the information is widely disseminated while the private markets, you know, it's again, it's maturity. It's small company, mature company…

00:36:09,520
Alex Miller - Host
Some very mature…

Tony Kim
Some very mature company,
00:36:13,760
but it's illiquid and there's some more obfuscation of information. But at the end of the day, it's a company. And all companies, in my opinion, and it's even more apparent now than ever before.…it's a power law. It's a power law game. And, it doesn't matter what you're doing, you could be making potato chips or AI foundation models or robots. You are subject to power law.
00:36:51,400
And the competition, the economics, there will be only a few. Isn't that movie Highlander? There can only be one. You need it because it's creating. It is the Cambrian explosion but only a few things make it. And so there's this vetting that's going on. And so what, what you see is, you see that vetting in the private market.
00:37:14,680
There are 20 of these companies, and then the two that start to amass critical mass, and everyone's attention is on that, but there's 18 that failed. In the public market, it's the same thing. You know, it, we, people say that the, the number of public companies has reduced.

00:37:34,840
Alex Miller - Host
Yes, there's that statistic, isn't it?

Tony Kim
Yeah. And not only has it reduced, the market cap is concentrated.
00:37:36,000
So you have less companies with bigger... It's called power law. And so there are differences, like you say, but my lens is the same. All I do all day long is to adjudicate that decision. Is this a power law winner or a power law loser? You know, public, private.

00:38:05,360
Alex Miller - Host
So maybe less about public/private and the liquidity debate and more about ultimately their ability to win.

Tony Kim
Yes. You have to win.

00:38:14,120
Alex Miller - Host
So we've covered a lot of the ground today, and I feel like, we've really kind of, you know, brought to light what's happening today. Maybe Tony and then Alex, you could just kind of leave us with a parting thought as, which our listeners could think about in terms of what you're excited about looking forward over the next two or three years. What, maybe it's a technology breakthrough, maybe it's something in AGI. What is it you're looking out for that signals that perhaps we're moving to the next step of this AI era?

00:38:40,600
Tony Kim
Next two years, I think there'll be many of the same things that just continue. You will be interspersed with these moments of wonder maybe, like this Moltbot thing.

Alex Miller - Host
We just saw, yes.

00:38:56,680
Tony Kim
You know? But I do think it will also, you know, oral robotics breakthrough, self-driving. I think it'll be a series of these things, but the underlying tenor will be performance of capabilities at the frontier keep scaling, the compute keeps being invested, and then a little lens in the future, which I, you know, I just, it's really just, I mean, sucked me in the last couple of, last two years, like you could say, is, you know, it's, maybe because I'm a SCI-FI guy, you know, will we see the beginning of the space frontier and a whole new economy that just kind of starts to emerge. So that's what's really interesting. And all of that is, you know, wrapped into this rubric that is called AI.

00:39:47,120
Alex Miller - Host
Fascinating, Alex.

Alex Watkins
I think for me, it would be similar.
00:39:50,560
So space, quantum computing, autonomy and agency, i.e. complete tasks being performed by AI. And then I think as you, as you think about this, this year, next year, the year after in terms of activity, I think we're not only going

to break all previous records in terms of activity, I think we're going to see the most variety we've seen. So I think frankly, that really is the right place, the right time.

00:40:12,840
Alex Miller - Host
Well, exciting times. Thank you both Alex and Tony for this magisterial survey of what we've, you know, what's happening in this space. Really interesting. And on behalf of all of our listeners, thank you for being with us today.

00:40:24,400
Alex Watkins
Thank you, Tony.

Tony Kim
Thank you very much.

Alex Watkins
Thank you.

Tony Kim
Thank you.

00:40:27,800
Alex Miller - Host
Two things that really stood out from today's conversation. Tony highlighting the global labor workforce and how that's going to really change the way in which our world looks over the next five to 10 years. And then Alex reminding us that companies need to be crystal clear about what their value is in the ecosystem in the AI era.
00:40:45,840
For more on this topic, which is going to dominate as we know the next few years, do listen to other Citi Institute Podcasts and reports which you can find online.

(pleasant upbeat music)
00:40:54,520

(bright music)
00:41:30,000