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Welcome to the brainstorm episode 18 here.

Today we're talking Osempic and other GLP ones.

Learn what that stands for.

We're going to be talking AI companions.

And then lastly, we'll touch on Tesla's recent price cuts.

Allie, thank you for joining us.

Maybe we just dive right in, GLP one.

What does that stand for?

Okay, you're probably never going to say the full word again, but for anyone that wants to know, it stands for Glucogen-like peptide one receptor agonist.

And these have been in the media a ton.

These are the so-called weight loss drugs, typically known for diabetes, but have been sort of, you know, everyone is talking about them for their weight loss properties.

So essentially it's a medication that basically stimulates the release of insulin.

That helps lower your blood sugar level.

And then it also makes the emptying of food from your stomach slower into your small intestine. And what that does is it makes you feel fuller for longer and it makes you want to eat less. We've also heard it helps with sort of curving your cravings too, like your sugar cravings or things for unhealthy foods.

It also can help even with things like tobacco or anything that may cause you to become addicted. So addictive behavior may also be helpful.

But what we're thinking of for GLP one, so there's a lot of research done on, you know, how they fare and the different companies that are working on it, including like Novonortis and Lilly, two of the biggest that are working on it currently in the space.

But what we're kind of focused on is like, how does this shift spend?

And we think that's a really important topic because if you can see the chart or if not, health care spending is continuing to rise, which I don't think is surprising to anyone to find out, but it's not necessarily leading to better health outcomes.

So if we look kind of in the 1980s, health care spend as a percent of GDP was around 8%. But then if we look into 2030, our projection is that it can get as high as 20%, which is obviously an increasingly high number.

And if we're going to spend that much, we at least want to see better health outcomes. And we're seeing that, unfortunately, the United States is an outlier, meaning that according to Dali, which looks at disability life years, so disability adjusted life year.

And if you look at that compared to health care spending as a percent of GDP, we can see that the United States spends a lot of money on health care, but does not get particularly good disability adjusted life years, meaning that our health outcomes are not good compared to many other countries.

Conversely, the Republic of Korea actually spends less on health care and has better health outcomes.

But in the United States, we spend about \$4.3 trillion, and about 16% of that is spent on health care therapeutics, so medications.

Other things that we spend on are indirect costs like you missed work or you're unable to show up and be productive at work, or other direct costs like nursing hours or things like driving to an appointment or going to a physician's office.

And so what ARC believes is that in the future, we're going to shift the bucket of spend increasingly into therapeutics.

And what's interesting about GLP-1s is that they have already started to shift some of the bucket of money.

So, for example, we're seeing bariatric surgeries.

People are spending a little bit less on that and more actually on the drugs.

We know that when Walmart reported, they talked about a decrease in their sales of food, but an increase in their sales of prescriptions, so an overall benefit, but just interesting

to see the decreases and the increases in particular categories.

And so we think, yeah.

Sorry, I have one question just to help give some more context.

I think on Fridays, it may have been you or maybe someone else in the brainstorm.

This is being prescribed to how much of the US population today.

I thought it was, I think someone said nine or 10%.

And just hearing you speak about it, it does sound like this miracle weight loss drug.

What are some of the downsides?

Yeah, exactly.

So as with anything, there are downsides.

One it's relatively new.

We've known about it for a long time, but the mass amount of people taking it, we'll see.

There were reports in Europe about suicidal ideation.

It was very small study though.

And the other thing is that maybe people who were overweight had some suicidal ideation based on other things that were going on with them.

We don't know, but that was a relatively small sample.

But there are things that can happen.

So one of the ones that I think we discussed on brainstorm was nausea.

So this can cause a lot of nausea, which can help you with curbing your appetite.

It can cause things like gastrointestinal symptoms like vomiting, diarrhea, you can get

abdominal pain, constipation, bloating, gas, all the good gastrointestinal stuff.

Also, just so everyone knows, there is an oral, but most of these are injections.

So you're injecting them into some area of fat, which means that you can get an injection issue. So this is also self-injection.

So you're doing it to yourself at home once a week.

Most of them are once a week.

So you can get some type of injection site issue, whether that's redness or rash or anything like that. Obviously, one of the symptoms is decreased appetite, but most people are very happy about that one. You can get things like pancreatitis, which is like an inflammation of your pancreas. You can get gallbladder problems, kidney problems, hypoglycemia, so your blood sugar can be very low.

Also, they've seen some connection in my studies with thyroid tumors.

And so you wouldn't get a thyroid tumor, but they have shown that there was increasing suspicion that maybe there's some kind of association between GLP1 receptor agonist and maybe certain types of thyroid tumors, maybe medullary thyroid cancer.

And so, yeah, there are definitely reports that we've seen, but with the amount of people taking it, like you mentioned, 9% to 10%, there's not been a ton of reports. And so I think people

are continuing to take it. We also talked about the fact that it could be severely underreported, because people that are taking it through insurance are probably the ones that we know of.

But there have been other people and clinics popping up everywhere that we've seen,

and I don't know whether those are being reported or not, because a lot of people are paying out of pocket. And maybe just for context, like out of pocket, you could pay \$500 to \$1,000 and maybe up a month for these drugs. Whereas if you had insurance, you'd probably be paying \$25 to \$30 a month. So big difference. Yeah, got it. Thank you so much, Allie. Yeah. Thanks, guys. Thank you.

All right. Now we're switching gears to AI Companions, AI Hardware Proliferation.

We've got Andrew Kim joining us and Reggie James. Reggie is the founder and CEO of Eternal. Reggie, maybe you want to give a quick, quick background, then,

Andrew, you can tee up the topic here. For sure. A quick background on Eternal or on hardware and AI. On yourself, your background. Why you're an expert in this area? You've thought about this. Yes, I've been thinking about hardware a lot. I went to Penn with Sam, and I've been working on my company Eternal for, will be five years in November. We were primarily

in Spatial. So we've been on a long quest of kind of building out kind of

like non-gaming, like spatial apps, primarily in social and media. Right now, we kind of crack something in like kind of spatial live streaming. So you can kind of think about the things Fortnite has done with either Dragon Ball Z or Travis Scott as spatial live streaming. One utilizing kind of an avatar that's on Rails, another one utilizing kind of screens within virtual spaces.

And so, yeah, our app Eternal is in the App Store. And we just think a lot about kind of like spatial and our starting more experiments in AI and just smarter NPCs. I haven't really branded the term just yet, but smarter NPCs that are a new form of interactive media. And then on hardware, I've been just kind of hardware whispering to a lot of hardware startups

and helping consoles on brand and product and really believe we're in sort of a new hardware era coming out of iPhone singularity and been writing a lot and putting together talks in a conference very soon on new hardware with new hardware founders and getting everyone together

in space. Nice. Then Andrew, maybe we just dive right in. Why is it so hard to monetize AI NPCs? Or just go right into the AI. Yeah, let's just talk about consumer AI applications as a whole. So we've been doing a lot of work on AI companionship with the explosion in chatbots that consumers have witnessed in the past year or so. And more specifically, and like listeners will be able to see specific charts on this week's Sunday newsletter. We see a huge disparity between

the net direct monetization rates per engaged hour of consumer AI applications and comparable mature digital entertainment platforms. For example, we estimate that character AI, which we've talked about before, monetized at a rate of 0.002 cents per engaged hour this past August, which is basically around 5% the rate of Roblox in 2022. And similarly, replica another companion AI app monetized at a rate of 75 cents per engaged hour in 2022, or 22% the rate of only fans. And we can attribute this monetization delta to a lot of reasons, right? One being the markets super early, right? Many players are prioritizing user and engagement growth over monetization. So we could see these rates reach parity simply as time progresses and the market matures. We could also look at the human premium, right? But we could also argue that as large language models become more and more performant, one day AI output across any medium would be

like indistinguishable from human creation. And that human premium probably would close and maybe  $% \left( \frac{1}{2} \right) = 0$ 

some sort of like vintage premium would exist, right? And we could also look at it from the perspective of like pure tech deflation. And I think like ARC has been talking a lot about just like all these different productivity case studies, like the GitHub co-pilot study, the UC San Diego like patient response study, the HBS BCG study, or even the like the GPT4 results on

UC San Diego like patient response study, the HBS BCG study, or even the like the GPT4 results on like all these exams itself. We've seen direct proof that AI is executing tasks at the level or even better than that of an average human, right? At a fraction of the cost. So there's like a lot

of question, I think still in terms of like who eats that the bulk of that gap, right? Is it the end consumer? Is it the application? Or is it the foundation models themselves? Like what gets commoditized? What margins are hurt? I have no idea. We'll see. And just one last potential reason that I think is worth discussing here and is like a great segue into like the hardware multiplicity that Reggie talks about a lot. I think it's pretty compelling to consider like AI's current lack of audiovisual immersion as a primary contributor to this monetization gap in that consumers currently primarily interact with AI entertainment via text, right? With pretty limited audiovisual features. And it's reminiscent of the non arcade video game market of the mid 70s to early 80s in that in 1975, we estimate that nearly 60% of non arcade video games were game releases in the year, sorry, were text based or spreadsheet video games, right? And console games generated around \$6 billion in revenue in today's terms in 1975, which is like very, very tiny compared to approximately like 92 billion of as of last year. And by 1996, text and spreadsheet games represented less than 1% of annual game releases. So this shift from text based and spreadsheet games to more immersive 2D and by the 93D games enabled video games to kind of tap the masses and grow to the size that it is today. And of course, this shift was made possible by Morse law and other cost declines associated with, you know, custom graphics chips, memory, et cetera. Right. And we're already seeing movements towards more audiovisual immersion. I think Nick probably talked about it in last week's brainstorm about, you know, Meta's AI avatars and the Meta Ray ban, smart classes, right? And we saw all these AI wearables that were showcased last week, or was it two weeks ago now, tab rewind pendant, the human humane AI pin. And yeah, as Reggie mentioned before, I think it

bears the question of like what happens to the mobile user interface, right? If we are actually going through like this hardware paradigm shift and like how, what will AI applications look like? As in will they reside within the application or will they be on the operating system layer? Like a lot of so we interesting questions that we do have. We do have Reggie. So let's open up maybe this question. And just after hearing what Andrew is talking about, Reggie, I see you taking some notes. So I'm curious what your, what your thoughts are just, you know, on the hardware side, because it does seem that, you know, as you move from text to audio to, you know, maybe 3D spatial, maybe the mobile phone, the operating system iOS, Android, isn't the right vector for this growth. Maybe we need more hardware. So what are your thoughts? For sure. Well, yeah, so I think there's a couple of things there, right? One exercise I used to like doing is kind of looking at what if Apple treated its microphone the same way it treated its camera, right? Which is essentially to say like, you know, this has progressed with like three, all kind of doing different things, including front hole, you know, but the microphone is largely the same and Siri is, unfortunately, largely the same. And it kind of just shows in part Western culture values, right? Like we value the eye over the ear significantly. And so it's clear that they've had their path. And one thing about hardware, unlike software is that when you make a decision in hardware, you have to live with it for far longer of a maturity cycle than you do with software, right? And so I think some of Apple's values just don't align with some of the pieces of the three that you mentioned, right? The AI pin, Avi and Tab, and then, you know, I don't really care about rewind, but, you know, the fast follow of rewind as a result of this,

right? And it's living off of a completely different kind of interaction vector, particularly Avi, and I've chatted with Avi and kind of know a bit about that product. What's interesting, though, is that Avi pairs with the phone, right? There's a tab app in which it's helping contextualize and not just sort of get activated, like we typically deal with AI chat interfaces in which it can't start anything. Avi's can start towards you, which I think changes the paradigm completely. I think the other thing about that in terms of what happens with the iPhone is, I think the iPhone continues to push more into entertainment space than broad-based application, you know, the very classic launch of the iPhone is like, it's a phone, it's an internet communication device, it's an iPod, and I think it's going to just ship more into entertainment, and this is like the fun glass, and then I think the other devices are going to be opening some new vectors of kind of a utilitarian landscape, right? Tab is really much about memory recall, and it's very much a work device. I think the demos of humane also are guite, I mean, that's an anti, at least visual media device, right? No kid is watching TikTok projected onto their hand, so there are some real hard opinions there that are somewhat anti-consumer media, at least from a visual perspective, which kind of dominates the social media sphere, right, between Instagram, TikTok, YouTube. This is far more audio-based and, yeah, utility. Yeah, it's interesting to hear, wait, just one point here, Sam, because I think what Reggie is saying is extremely interesting, especially when you think about the evolution of how these AI assistants will evolve. If you think about the chatbot today, I think largely what both you and Andrew are noting is that the entertainment space is largely maybe untouched by this evolution of AI for a portion of its growth. I think it'll disrupt entertainment in a larger form over time, but I think when you embed an AI assistant or chatbot, where you can really start to have a profound impact is at the consumer services level, and so I gave this example, I forget who I was talking to, but I have six or seven different airline apps on my phone, and it makes sense that if I have a wearing tab or one of these AI hardware devices, I can just speak into or interact with that AI and it books out all of the services I need or is just intuitively listening to my conversations and prompting me then to go and check Delta for flights, and I think that's where it begins to obfuscate around the app layer versus the OS. I think it sits into this intermediary position where it is both the application and the operating system as one, and I think it disrupts services first and then entertainment in a broader sense later. It's disrupting entertainment today, but I don't think it's going to really have a profound impact on Instagram or TikTok for a few years. On the application piece, the main reason we want to have some sort of smooth interfaces because we know our preferences most intimately. so we want to be able to sort through that, but at the end of the day, that's just an API surfacing that information and as long as my agent has some awareness of my preferences or can surface two to three of my preferences, it takes a lot of that just sort of, okay, let me scroll, okay, let me type in New York JFK to LAX. All that can just go into here are the three flights, and it's going to know your preferences and then it'll just be like, do you want to buy JFK to LAX at 6 a.m.? Yes, it moves really quickly, and then it becomes a question of like, okay, well, what are the roles of any sort of aggregator, if my OS can be that aggregator, so things like price line type businesses, expedia type businesses really, I think are the things that really come into question in this environment. Totally agree. To what you're saying, Reggie, I think this applies beyond just commerce, but software broadly and connectivity,

and I've said this before, but it's like, right now we take for granted, or we don't appreciate how bad software is, right? It seems amazing because it never existed before, right? Amazon one-click checkout, right? Like, wow, this is frictionless. This is amazing. Ecommerce is booming. It's like, wow, the workday kind of extended because of mobile, and now you're always at your job, and it's like, that's just the beginning. One-click checkout is still a pain because you have to do this curation, right? Google flights, search through all of that. It still seems like we're unconnected if you leave your phone at home or it's off for whatever reason, and then we're going to enter this phase where curation is that next level of frictionless software, and if you're wearing an AI wearable, your life becomes connected, and if you're doing a job that's connected to the computer, it becomes even more 24 seven than you'd ever have imagined. Andrew, I know you were trying to jump in. Sam, just to maybe coin a term here, but I think what you and Reggie just surfaced for me is like, we're moving to one search checkout, right? You just have this search brought to you, and it's just exactly what you want, and you don't need to really do anything after that. So it compresses the funnel of search checkout, shopping online into a kind of instantaneous transaction that you didn't really even think you maybe wanted or needed, but when you see it in front of you, you're like, wow, that's exactly what I was thinking I was going to do. I like it. I like it. One-click checkout after hours of browsing Amazon reviews to single search checkout. Single search checkout. I think what's interesting here, though, is that in order for like an OS level AI assistant to be that personalized or be able to handle that kind of curation, I think what was kind of implied, correct me if I'm wrong, with these new hardware, AI hardware is like the continuous listening and ingestion portion, right? And my question is like, in terms of like consumer privacy, I feel like the iPhone at launch wasn't really feared as a surveillance tool, and that association kind of developed as the App Store ecosystem grew, and there were controversies around individual apps. But I think like with these new AI hardware examples that we discussed, it seems like that kind of quote unquote surveillance aspect is the initial value add. So I'm just wondering like, does that pose a material obstacle to user adoption?

Yeah, I think it always does, particularly because I think part of the reason we didn't view the iPhone as surveillance is because like surveillance capitalism hadn't even been written yet, right? Like, I don't even think we had that language. And at the end of the day, there was, there's, there still is like a deep trust around Apple as a brand, right? So I think the brand trust, the brand storytelling is going to be a key differentiator in like what anyone is willing to put on their body. And that that has nothing to do with form factor has nothing to do with anything, you know, unless it's a giant fricking leaping thing, obviously that form factor would get destroyed. Then, then I think, you know, there's so many ways for that data storage to happen. And whether, you know, it's folks leveraging kind of like web three tech, whether it's a sense of like, no, this data lives on my, you know, personal device and it's non networked and the way that your hardware and software gets upgraded is just like hardcore like model upgrades and not necessarily something that has to do with like the parent company cleaning through your data.

You know, I think we are going to have to unleash a new sense of when we update software, what are we touching versus not touching, right? Because I think there's a sort of cultural understanding right now that all of my apps, all the data of my apps live external to me.

And I think part of what's cool about new hardware, just as a category is we can reset or present new values on how we think about personal data and how those companies think about personal data and how to leverage personal data, ultimately for the benefit of the end user, right? And that means that maybe the software that leverages that data is going to change drastically. I think that's what like, you know, LLMs represent that crypto has represented that for a while. Regi, I'm curious, I have one guestion for you. You know, in hearing you talk about these new hardware devices and hearing the story about Avian tab and how it is integrated into the iPhone, do you think that Apple has a chance to help create this new ecosystem or do they just stand against, you know, the values of what this new evolution in hardware could be? I think the change of the to the USB-C port at the end of the iPhone is a deceptive way that they can support it tomorrow, you know? And I think like jailbreaking is going to come back into style because of that within like a niche scene, right? But if they recognize that like, okay, this is from all like, you know, early 2000s standards like a super computer today, and how that can be leveraged, you know, they already have some soft ideas between like even sharing power, right? It's kind of a, it's small, but it's a really sick just like base concept of like, yeah, this thing is also a battery for your friend's device. But I think Apple is just so, you know, they have to now be on the defensive when it comes to privacy that I don't think they can take that sort of cultural stance. They can't like take a any object and plug into this core object, right? Because then I think, you know, the counter forces to that image, I think are too great for them, right? So it's going to have to be more traditional and how they do it, which is like Bluetooth and things like that today. But people are already doing USB-C things. I have friends doing it now. So, receipt. And it's, you talk about form factor too, right? Whether or not Apple is actually to execute, you know, everyone throws out AirPods, you throw a camera on them, or even, you know, the Apple watch, if you want to talk about a innocuous way to record everything, it's like, you wear a pendant around your neck, you wear a pin, you know, those are like classic, this person's a spy. If you're, if you're just wearing, if you're just wearing a watch, that's a far more innocuous form factor. Or at least a cooler spy. Yeah, exactly. So then I guess Andrew and Reggie will answer simultaneously. I'll give you a countdown. What percent of the population will be wearing, or will, you know, have a non-smartphone hardware device in 2030? All right. You guys ready? Andrew? Three, two, one. 80%. Wow. Delayed and, and low. All right. Well, let's, let's just, let's, let's dig into this a little and then, and then we can wrap it up. Why, why the huge discrepancy here? I guess Andrew, we'll start with yours. Why, why 10? Well, I'm just thinking about like how we moved from just mobile in the late, I guess early 80s into the iPhone moment that took a while. So I was just thinking along those lines in terms of like to get to smartphone adoption, but maybe I should backtrack and think about just mobile adoption as a proxy. I don't know. I haven't really done the work here. You're kind of putting me on the spot. That's why it's a brainstorm. Reggie, Reggie, 80%. That's, that's pretty full adoption.

So what, what are you thinking? Yeah, I just think our speed cycles are faster, you know, to, to Andrew's point. Like I just think, did people think chat GBT would have like the adoption curve it did? Like, I think we're just going faster and naturally, you know,

chat GBT and then two and then three, like those were quiet and then it was explosive, right?

But let's say this is not a good comparison, but I just think about companies that were quiet and then huge adoptions like Roblox was quiet for like, you know, six years ish, then huge. Chat GBT are open AI in general, quiet for like three years ish, four years ish, and then like really pop in. And I think that's just going to keep compressing. I also think like, Avi built this piece of hardware basically off of like, you know, Adderall and work ethic from April to its first hundred units sold, you know, in like October 1st or end of September, right? That is like the our ability to build first versions of things and really get that feedback loop and on hardware is compressing, you know, it didn't take him a trip to Taiwan. Other things will, a lot of things will humane, you know, I assume they're flying to Taiwan nonstop, right? And so I'm not, I'm not saying that it's still not hard and insanely labor intensive. I think the speed is genuinely faster. I think the hunger is really there. And it's not the same switching costs as, let's say, Android, right? Like some of these devices will be accessories and not full replacement tab is an accessory humane is trying to be a full replacement, right? That's why they demoed a phone call. I think if you asked me for replacement devices, I'd be like, you know, if you're just saying a hardware in general, that either it sits on your desk or it sits on you or, you know, it's some companion device that that I could just see is as significantly higher or faster. Amazing. Andrew and Reggie, I was thinking about mobile replacement, maybe give me some credit on the low balling of the number. No, I was, that's how I understood the guestion. That's fair. We'll see. Amazing. Andrew and Reggie, thank you so much for joining. And I'm sure we'll have many more of these conversations as the development does happen guite rapidly. Thanks for having me. Awesome. Nick, now on to the last topic of the day. We've got Tesla cutting prices. Slashing prices. Slashing. And that's what that's what I want to address. First, I just want to put this in context and I'll pull up a chart here so everyone can see. And really what you can see is that this is going just below where prices were in the 2019 timeframe. And so you had this peak over COVID and that was a lot of supply chain issues, commodities spiked. And now the prices are coming down. I actually think this is going to be foreshadowing what will happen to other automakers. And then the other element I want to just flag here quickly is that the Model Y and Model 3 are less expensive without subsidies than the average new car in the United States. So average new car, 48,000. And the Model Y and Model 3 are below that.

And with batteries and electric vehicles, we are seeing cost declines. So for a long time, it was, okay, when do we get to price parity? Last year we were at price parity, but then there was a number of price fluctuations as macro environments changed. Now we're back below price parity. And what I tweeted out was saying, life after price parity is fun. There's no reason why batteries, which are the largest cost input into electric vehicles, should stop at price parity. That would be quite the coincidence if that was it. And so what we should see and what Wright's law suggests is we'll continue to see costs for electric vehicles decrease. And you'll either have new models come out, costs will continue to come down, or kind of tying back to the iPhone. You'll see that these existing models will sit in the same price segment, but performance will continue to increase dramatically. And so I think this is really exciting. I think there's a lot of noise out there talking about price cuts, should they be advertising. I think it's worth taking a step back and seeing where this is in the context of

overall cost declines and where EV prices are going overall.

Yeah, I think I agree with you. I mean, you know my thoughts on the chart that you had around the price cutting with Tesla, which I think is interesting because interest rates are much higher today than they were three or four years ago. And so this is, I think, a move by Tesla to stimulate demand. And I think Elon's even gone on record saying that they are happy to forego revenue and profit today because they believe that the autonomous opportunity tomorrow is much greater than the profits they get from just selling in a car today. So they just want to seed the market with as many vehicles as they can. And I think you also have another chart which shows that what a consumer would pay to finance a Tesla today versus I think in 2019, Sam, is pretty much the same even though the interest rate environment has changed drastically. Which I think is great for the consumer. Yeah, I'm glad you brought that up because I was going to forget it otherwise. So interest auto loan just guickly pulled 2019. It was like 4.7% in 2023. It's like 7.5%. So that's a 57% increase in the interest rate for auto loans. And so you have the vehicle monthly vehicle price, assuming 20% down payment, staying roughly identical between 2019 and today. So exactly what you're saying. Obviously demand at a certain price is the way the real world works. And so Tesla is making sure that consumers can still afford the vehicle despite this 57% increase in interest rates. Thank you everyone for joining us this week. We will be back next week with more exciting topics. Hope you enjoyed. Leave comments and questions and we'll try and address them. All right. See everyone. All right. See everyone.