The Rational Optimist Podcast

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Stephen McBride: So Aaron, Apple is often held up as the quintessential example of a US company that kind of lost its way as regards, yes, it designs the products in Cupertino, but it makes most of the stuff in China. If Tim Cook was with us here right now, what advice would you have for him?

Aaron Slodov: I guess we need a goal or an outcome. What goal am I actually advising him on would be my question just really quickly to you.

Stephen McBride: So it seems like they've been maximizing shareholder value, and that's done exceptionally well, but it seems like maybe that's no longer the metric to optimize for. Maybe the thing he needs to optimize for now is kind of like long-term shareholder value in the sense that you need to make stuff in America and make the, know, cut out the risks of your technology being, well, I guess stolen is the wrong word, but yeah, basically even innovation.

The fact that they've separated design and manufacturing seems to, at least over the last decade or so, has hampered their innovation.

Aaron Slodov: Yeah, I mean, I guess there's a couple things, right? Like one is if you have shorter-term windows that you're trying to optimize outcomes for like quarterly shareholders…

That doesn't help you actually, you know, build something more meaningful, even though they are a multi-trillion-dollar company. So if you look back at like the early days of Apple, they got pushed actually to move stuff there. So it was a combined effort on like, you know, on the government, from executives in, you know, other countries as well, trying to like build them a supply chain.

It's always more complex and nuanced than you would imagine it is, right? So building a supply chain as immense and complex as Apple's is not something that happens really quickly, right? So it's taken them 15, 20 years to get to this kind of a point. And it's still challenging for them to design something new and pump it through, right? Like this process or this machine that they've built over there. you know, Patrick McGee's book is really

enlightening in a lot of ways around this because it's just...

You know, we've spent, not we, but Apple has spent, you know, a hundred Marshall plans worth of, you know, today's inflation-adjusted dollars in building a workforce, factories, like the entire supply chain in China. And there were multiple forcing functions that pushed them in that direction. So, yeah, I mean, my advice, you know, would be starting like, one thing at a time, how can you actually go about rebuilding that supply chain here? Where can you actually see a place where a competitive advantage can be built or rebuilt domestically?

That stuff that just doesn't happen instantaneously, you know, throw it like we've seen this happen and play out with other companies, namely like Intel and TSMC. You can't just like magically throw up a factory and expect it to do exactly what you want it, right? Or like even build the factory in the first place. So we had to import people to even finish those things and get the engineers over here. And TSMC's factory in Arizona, you know, showed us that you can actually have better yields. But there's just so many different factors that go into making that happen, other than just move the factory there.

Stephen McBride: Do you think there is a will to re-industrialize on the big companies like Apple or Intel, or do you think this is like the perfect moment for those hungry young startups that are kind of starting from first principles and don't have all that kind of technical or company debt to overtake them in all these different areas?

Aaron Slodov: Yeah, I mean, I think what we're seeing now is that the last, I don't know, call it like 100 years, and you can break it into like two pieces. Probably not 100, maybe like 80. But where we're at right now is a unique moment, right? Because we're just, learning that globalization ultimately wasn't the unique force for good that we all thought it was gonna be. And I think a lot of people put their faith into that as a gamble back in the 50s and 60s.

But ultimately, it hasn't really played out the way that we thought it would, know, namely because building up one other superpower, we still haven't, you know, conquered like human nature and the desire to, you know, push each other around on the global stage. So there's basically like a much larger looming factor, which is that. And if you, you know,

If you basically turn one country into the factory of the world, they're obviously going to, you know, they're gonna gain a lot of power and a lot of resources by doing that. And they're able to switch their industrial base, you know, into dual use. And they have capability where we just don't, right? Like shipbuilding. So. And, you know, with drones, they have a crazy advanced, you know, microelectronics supply chain.

So it's, it's pretty interesting that reversing that trend and people seeing the need to do that, like today and now it's been, it's been something that's been unfolding, right. For years. COVID made it even worse when supply chain became a household term, right? Like when you couldn't get toilet paper. So.

Yeah, I think it is a really interesting moment. And I do think that young hungry founders, this is a great moment for that kind of stuff. But it's also, these are not quick, easy wins. This is stuff where you really have to dig in. It's gonna take decades to build. People have to be in it for the long haul. But this is a, I do think the will is there and people understand that. And it's not even like, yeah, we need to rebuild everything China can do here, it's just that you need more than one China, right? Like, they would rather see the world completely de-industrialized and dependent on them, and that can't happen. So we still have to stay in the game.

Stephen McBride: Say more about why America needs to reindustrialise. What breaks if we don't do it?

Aaron Slodov: I mean, we've already seen a whole bunch of this stuff playing out, right? Like in defense world. So not being able to make 155 millimeter, like, you know, artillery shells. And we sent them all to Ukraine and now we can't produce any, like we have no back stock. Those would be depleted like very quickly, right? Shipbuilding, obviously is another one. Drones.

Anywhere where you notice that there's this critical, you know, deficiency basically, and we can't we can't produce something. Ultimately, it does come down to it comes down to like, do we have the capacity and do we have the trade skill necessary to like execute on it? Because you can, again, yeah, you can you can build all the factories you want. But if you don't actually have the skill to run and operate them, it doesn't matter. Yeah.

Stephen McBride: I think I've heard you talk about how the US, we literally forgot to build critical parts for B-52 stealth bombers, maybe for listeners that haven't heard this story. How do you even lose that knowledge? And if you lose that knowledge about something that seems really important, what else have we forgot to build?

Aaron Slodov: Yeah, I mean, the story there is kind of interesting, but there was a heat exchanger in the B2 that was designed and engineered by somebody who doesn't exist anymore, you know, and...

It could be a matter, like we won't ever know the real truth of this, obviously, but like the engineering drawings, the blueprints, the schematics, right? Like the simulation data, who knows where that is. And even if you had it, would that help you like recreate this part that they needed? That's kind of the million-dollar question there. And ultimately, when you, when you lose that tribal knowledge, you ultimately like cannot make, you know, a widget or a product or something because you can't connect the instructions to the actual final output. So it's a fascinating problem. And there's other really weird stuff like pipes. The people that used to make lead piping that is in a lot of municipal water and sewer systems around America that has been replaced over 100 years.

The way that we used to make those pipes, like nobody knows how to do that anymore. Not that you need to make lead pipes anymore, but like if we wanted to make them out of anything but like PVC, right? A lot of that kind of like, just these weird crafts that, you know, because we don't use a material or a thing anymore, it's just gone. And so you can't like relearn how to do it all of a sudden. it's, you know, in like my company, we were working on preserving tool and die making. And that's something that has reached dangerously critical levels on how much actual trade skill there is in this stuff here. And a lot of it, where we built our company in Detroit, is just kind of the leftover remnants of the automotive industry being there. So it's fascinating, right? The kind of like, I don't know, the fingerprints that are left on society where you had to learn how to do something and who that skill was passed on to.

I still think that that's actually kind the lifeblood of a lot of these problems, ultimately.

Stephen McBride: Before we get into what Atomic is doing, is actually just talk to me about all the different components of re-industrialization and manufacturing in America. Because it's often talked about as this kind of big blob of this lump of labor, fallacy, but within that there's so much going on, right? As you said, there's the skilled labor and the tactic knowledge. There's energy, there's the factories themselves. So maybe just break it all down for us and then what are the biggest problems to be solved? Over the next 10-20 years.

Aaron Slodov: Yeah, I mean, this…it's going to be interesting to see how it comes together. And, know, like we were talking about not having to duplicate necessarily like everything that China does. We're not necessarily trying to become autarkic, right? Like we don't need to make everything for ourselves. We can still have some level of globalization and trade like that's fine. Obviously, it's just kind of like reselecting what level we want. And we're obviously going to be starting with things that are more critical in nature. And we're going to start with things that are likely higher value.

But the interesting notion to this is that what people perceive as like low-value manufacturing, right? Like making little low-value commodity parts and things like that. A lot of that stuff can actually be done in a high tech way with higher margin, right? You can convert low-skill commodity things into the opposite basically by kind of like reinventing the process. And I think all of the different buckets, right? In something like this, in reindustrialization, you do have to like break it out.

And ultimately, yeah, it's a huge full-stack problem. You've got an actual demand, right? And this is the classic thing in manufacturing is that you cannot just make a factory because there's zero demand there. And this is kind of what we're running into now, but you want the capability to make something when you need it.

And that's ultimately a function of being able to create something that's like dual use, right? Like is it, you know, for defense, is it for commercial? You're never really gonna solve that until you've got magical sci-fi technology that where you just, you know, like the Star Trek replicator or something.

Yeah, the layers of this are basically like demand and policy kind of at the top and policy obviously is gonna drive all the incentive. Demand is still demand no matter what. And then beyond that you've got like the finance side of it, like who's actually going to finance these things, where in the stack are they gonna finance it?

Because traditionally, starting a factory, you need a bunch of capital to do that. And you can't just go walk into a bank and say, I'm gonna go make a factory, can I get like 20 million bucks? Like, nobody is gonna do that. So starting a factory in the first place is also a pretty hairy like, you know, barrier to jump over initially. So there are, you know, there's a capital barrier to jump through.

Then ultimately, you've got this huge list of like manufacturing and industrial processes that can be ripped apart and rebuilt, you know, in this way that I'm talking about. It's just kind of like, you got to go pick, you know, the one that you want to go work on. Ultimately, I mean, it's in America in terms of GDP, it's, you know, a $14 trillion slice of our GDP.

So if you can extract something out of that, right? And like improve it and 10X it, that's a billion-dollar business, like easily. This is also why it's impossible for somebody to like monopolize manufacturing, right? There's not gonna be like a Google of manufacturing, not anytime soon anyway. That's just like, you know, a multi-trillion-dollar company that can make anything right? Like not even Tesla and SpaceX between them.

can do something like that. Elon would have to shift his factories around in a massive way to be able to do something like that. this is what people don't really understand about manufacturing. If you gave Elon a bunch of money, he could make a factory to make something really well. But the way Tesla and SpaceX are set up is that they've hyper-optimized the production of five things, like Starship and then four different car models, basically. And they're gonna do it with Optimus robots as well.

Aaron Slodov: It just it kind of like goes to show you that that is possible, right? And then below all of these like thousands of manufacturing and industrial processes. You've got like the machines and the raw materials and all this other stuff. So part of the value chain there is where are we gonna be getting all of our raw materials from? Are we gonna start mining and refining again? Right, like we're seeing that now with rare earth magnets and materials Like the government literally buying a stake in these companies to push them further and faster should show everybody how critical this actually is.

And you can make an argument for even just basic stuff. Copper is gonna, it's gonna happen to copper probably too. And then the actual machine tools, like CNC machines, lathes, 3D printers that are industrial grade.

We don't really make this stuff here at all. We rely on other countries to make all of our machine tools. There is a machine tool company in America, they rely still on China for half of their bill of materials to make their machines. So yeah, it's crazy. So you have all of that, and then the skill and the labor. So I know this is a lot of stuff, but this is kind of like what's rattling around in my brain at every given moment.

That layer cake is kind of the necessary constituent parts that you need to re-industrialize, right? And then there's actually compute and other stuff that people don't really think about, like the compute where AI is moving, right? Like new computational methods and things like that. Those unlock a lot of potential for the world of atoms, basically.

And we haven't seen you know, like a foundational model or an AI lab or an AI company that touches the physical world yet. And like, you could argue that some of these robot, like the humanoid robotics companies are that, but they can't do actual real manufacturing, right? Like translating a customer's CAD file into instructions that go through a CNC machine and cutting metal, you know, to like five-micron or below tolerance levels. So there's, there's a ton of stuff that,
technology can really vastly improve, like physics simulations and all these other things. So, I do think that we're in a really exciting moment right now. So, I know that was like ultra long-winded, but...

Stephen McBride: And we didn't even mention energy.

Aaron Slodov: Energy, yeah, it goes in without, I mean, I guess it's just kind of a no-brainer. Like before I started any of this, my PhD was in a field called power systems engineering, which is all of this basically.

And it was a gamble on you know, the electrical infrastructure of the United States needing to be transformed ultimately, right? Like with new sources of energy, with energy storage, like rethinking how the grid actually works and operates. And I think we're going to see something like that. Like most, most people that are focused on this problem are trying to just pump as much as they can into the grid with new, new sources of energy to power data centers.

But there's insane bottlenecks everywhere. Transformers are huge. Grid-scale transformers are gonna be the next bottleneck because 90 % of them are basically at retirement age and nobody makes them and they've got a three-to-five-year backorder window on them, right? So we're not gonna be replacing transformers in our grid anytime soon. So that's another

easy billion-dollar company for somebody to go start, literally right now.

Stephen McBride: Do you think it's a case where all big manufacturing, industrial processes, AI data centers, these are things—do you think that's all going off grid? And they'll just have their own solar plant or nuclear plant or whatever?

Aaron Slodov: I mean, it's gonna come, I think it's gonna be a mess, honestly, because people, like, the companies wanna move faster than the government will regulate, right? So, like, this admin particularly is trying to slash red tape and regulation so that people can move quickly. But, you know, like, even today, I still can't go develop a reactor that fits in a semi truck and then go park it outside my factory or my data center. Because what they're doing right now is they're using those gas turbines to power these data centers.

There's a sprint now, right, to like July 4th of next year to turn on the next first reactor from one of these startup companies. So I want to see them all split atoms, right, like as fast as possible. But I also want them to be able to park their reactors outside of a data center. But, you know, if you think about the public perspective of that, hardly anybody in the public probably wants that, you know, they probably want the data centers to be as far away as possible and like get the nuclear, you know, football in the truck away from my house. So it's, I get it, right? Like, don't know. It's, it's going to be a mess. think.

Stephen McBride: You talked about there being no Google of manufacturing. you think just by, first of all, would it be possible for a startup in the next five years to create almost a manufacturing as a service factory where you can make 10,000 different things a day with humanoid robotics and AI and all that stuff? Do you think an idea like that is possible?

Aaron Slodov: Not within the next five years, no. I mean, the idea of, just like the complexity behind something like that. And I guess it kind of depends on what you're trying to duplicate, but you know, when you go online and you see people complaining about how no American, you know, manufacturer or like shop, like smaller shops won't like take their weird order for just like one widget.

Like obviously they're not going to take your order like a Chinese factory will because nobody gives a shit. It's like they're busy doing higher value work and like a Chinese factory is probably just sitting empty, you know, and like they'll throw your thing in there because most of their power, their infrastructure, their raw material, you know, like has been subsidized by the government over the last, you know, 25 years.

So it's, it's not really hard to understand like why that happens the way it does. Right. People, people just treat China like it's an API for crap. Basically. It's just like, yeah. Like go on WhatsApp and just text some random guy in a factory and like, he'll send me my, my widget, you know, like next week for, for like a dollar. I think it's…

If you can't actually understand why American shops and suppliers don't do that, like you should probably, you know, reevaluate your understanding of how manufacturing works. But at the other end of that spectrum is like, why can't we do that? but it's, you know, there's a there's a huge answer to why that is, but in general, it's just…

American suppliers and manufacturers have to survive on, you know, high-margin work. Otherwise they die. And the further…and you have this like big balance in the world where, you know, other industrial bases can like push the floor down on everything because they've been subsidized or they have cheap labor, right, or they've become really good at something over time and they can do it for less ultimately, right? So if you push the floor down, that just kind of like tightens the margins that you can actually do here.

Unless it's work that you cannot literally send overseas somewhere and it has to be done domestically, right? Which is a lot of defense stuff. So it's just super interesting how like the equilibrium of that ultimately works. And you know, what we're trying to do is just like rebalance that equation by throwing tech at, you know, a problem that has an insane amount of human like labor and engineering that goes into every, every customer project and you cannot short circuit it basically.

It doesn't matter how cheap your labor is. That's why I like the problem that we're working on because ultimately there's no way to short-circuit it. So like we're the only way currently to do that.

Stephen McBride: Well, let's get into what Atomic is building and, you know, tell our audience maybe start starting from the "explain like on five" level and we'll work our way up.

Aaron Slodov: Yeah, basically, to mass produce stuff, you have to make a mold of a given widget, and it's like a snapshot of that thing in time, right?

And you can build molds at all levels of complexity, right? So you can 3D print them out of plastic, or you can spend a thousand hours of engineering one and then cut it out of steel, you know, for production use in a factory somewhere. So there's a huge spectrum of how complex and expensive these things get. We operate on the far extreme of like production readiness, right?

Like a single mold that we'll make is hundreds of thousands of dollars and typically takes months to design, simulate, engineer, and then ultimately build it and put it together before it goes into a factory. So it is super interesting and I said mass production but typically the volume of production doesn't really matter a whole lot.

I mean it's largely used for producing a lot of a widget, right? But if you want the most reliable and consistent way to pump out one thing over and over again, it's to make a mold like this, right? Like at the highest spec that you can.

So examples of lower volume where that happens are like the nose cone on a missile or something, right? Like those are molded. But it's not like Lockheed or Raytheon are making millions of missiles every year, thankfully. But they will make, they will engineer a mold, right? So that like when they need 500, they just go set it off and it pumps them out. And they come out to the exact spec that they need. So.

Aaron Slodov: We've invented a lot of technology to avoid having to make a mold for something just because it takes so long, right? And it's very expensive to do this. So we're basically trying to like smash the cost curve and the time curve on being able to like make a mold for something.

And then when you have that power, that capability, what do you do with it? Do you just make molds for other people or do you start making parts for them? Because ultimately, people just want parts, right? They just want the part. They have to go through the mold making process. So, to your other question, can we have some kind of magical company or something that can produce?

Thousands of different things, right? I wanna work towards that with this capability. It might take a little bit longer than five years to do it, but ultimately, I'd like it to become kind of like an AWS, right? Like what these cloud computing companies did for the internet. They took something where it used to be a very bespoke process to go into a server and set it up and like, build your company's infrastructure on bare metal and then put it in a data center somewhere connected to the internet.

And now Amazon is like, you click one thing and it launches a server and all of your code and you're done, which is sweet. So can't we just do that for physical crap too and be more like China in that way? I mean, that's kind of how I imagine this and it's really tough to do that because people design stuff without understanding how the factory works or what it can do, but you need to connect those together, right? And like going back to your original thing, like Apple separating design from production, like the closer design and production are, the better, ultimately. It's just that like production is a really hard problem and it's not generally a flexible thing where it's, right? Like you have a factory that just makes anything and then designs come into it, it doesn't work that way. You have to, you know.

You make a factory for something and then you can you know, hyper optimize that. I want to see a world where that becomes a little bit more flexible, basically.

Stephen McBride: If I was to walk into your factory, what would I be most surprised by?

Aaron Slodov: Probably maybe like the size of some of the machines that we need. A mold, when you start building it, just starts out as a giant block of metal. It has to go through different machines to ultimately pare it down into more refined features. Or when you chop up the metal into different components that go inside the mold.

So yeah, the initial machine that we do roughing operations on, which is take the initial raw block of metal and then beat it up and cut it as fast as you can. that machine is, I don't know, it's almost 20 feet high. It's the size of a house. It's insane. So I think some of the machines are probably pretty striking.

Stephen McBride: Talk me through the kind of step-by-step process in creating one of these molds. Is it a customer comes to you with a problem and then what do you do next and then what's the end product, just step-by-step?

Aaron Slodov: Yeah, I mean, generally speaking, you start with a CAD file, right? And the CAD file represents some part and depending on who the customer is, they may or may not have an understanding of manufacturability, right? Like this idea and this concept of, I should probably design this so that it can get made relatively easily, right? So the whole idea and concept of design for manufacturability like DFM is applying the constraints of the machines and what they can do to a design. So if you put certain angles or features into a design that a CNC machine literally cannot make, then you have to use a different method of production to make that shape.

And all of these different factors will drive what type of production method that you actually need. So if the shape of it ultimately changes the production method, because you cannot use a CNC machine or a mold, and you have to 3D print it or cast it or something, those are things that the customer needs to understand or be educated on. this is why the entire field of manufacturing is just so insane. I wanna answer your question really simply, but it's hard for me. Because basically it's like…

Yeah, take a CAD file and then, you know, somebody who knows how to make a mold looks at it. They go into CAD and they have another person who's on simulation software and they start designing. You know, they design the mold. It's basically a reverse engineering problem where—or inverse engineering. It's like, here's a shape. And with all the tribal knowledge I know, I can construct the mold that's going to make this part. And it, it can be, you know, it can be really complex or it could be simple.

But ultimately you have to like you have to know the mechanics of mold making right in general and then you create an initial design You have your simulation guy simulate it to understand right like the actual production properties like where is this thing gonna get hot? Is it gonna have problems like opening and closing? You know…you have to simulate that stuff and ultimately

It's very trial and error driven because reality is different from what we can simulate. It's not always super accurate. You basically end up spending a ton of time designing and simulating up front. The machining of the actual pieces of the mold is the smallest part. And then the back end is like trial and error. So it's like put it together, polish it, test it, and then you have to like error correct when there's an issue. So it's just a really, really intense process. And for like one given widget, it can take like a thousand or more hours of human labor to go end-to-end like that.

Stephen McBride: We often talk about this as the bits, bits versus atoms, bits-to-atom shift. But talking to you and other entrepreneurs, it seems like really where we're going is bits and atoms. There's a ton of, you just mentioned simulation, but you also mentioned the 20-foot-high machine. So just talk to me about the trade-off, maybe the difficulty of balancing those two.

Aaron Slodov: Yeah, mean, ultimately we're an industrial society, right? Like, we're not gonna get away from needing things. And ultimately the argument that machines and our ability to use them and like, know, sculpt matter to our will allows us to just like build more, right? It's Jevons paradox for just like the physical world. So yeah, of course it's definitely not one or the other. It's just more that like, you know, we're never gonna just like eat software for breakfast, right? Like software's not gonna drive us to work every day or wherever. So like things still have to get made, it's just how. So I think that like, yeah, it's 100%, you know, obviously like a hybrid.

And it's something where as software gets more and more advanced and people are able to see, you know, the impact of what technology can do for the physical world. Like we're going to start seeing more and more of that. Right? And like most of these skillsets don't exist at all. you know, like the closest thing I can think of is doing applied AI, right? Like if it's robotics or self-driving cars, or robots in a factory doing some specific task, right?

The more people that have this expertise of taking a physical system and optimizing it for like a task and then ultimately building like machine learning models and, you know, conventional compute algorithms to accomplish that. That's the, like, those are the skill sets that we need to be building, you know, the fusion of these things.

Stephen McBride: So I have three young kids, what would you suggest? What's the top two or three things you'd suggest they go into? Studying their spare time.

Aaron Slodov: In their spare time?

Stephen McBride: Sure, I can help them.

Aaron Slodov: I mean, this is, this is interesting, right? So like, AI, is really uniquely positioned to, help kids like learn ultra complex stuff, like way earlier, than they normally

would through primary school or something. Right. So, I think that like, getting them jazzed up about stuff by exposing them to like, yeah, take them to an air show, take them to like, you know, an aerospace museum or just any, museum, right?

Like expose them to all this stuff and like show them big machines and like that like really cool stuff like that, you know? Like I think this is the one thing that persists through adulthood with maybe with men, but we're always in awe of a giant machine doing something. It's like, if I could do that, that would be badass. I think, yeah, like, jazzing kids up by exposing them to a bunch of this stuff and then using AI to help communicate really complex concepts is something really interesting. And then the hands-on aspect of it, right?

Have them build stuff, even if it's out of like balsa wood, you know, or like LEGO K'Nex or something, like help them make little machines and like get, you know, more and more advanced, like do rockets. Yeah, I mean, there's a ton of stuff, right? And like, if you have the capacity to do it, like get, you know, 3D printers and CNC machines, like desktop versions, you know, in your garage or wherever your basement. And like build stuff with them. That's what I would do.

Stephen McBride: Do you think there's going to be a bull market in apprenticeships? Where I'm going with this is obviously there's a four-year college degree. It's been that thing that's been pushed on every kid for 40 years now. It depends obviously, but is going and getting a four-year engineering degree the way to re-industrialize America or is it apprenticeships? Talk to me about all that.

Aaron Slodov: Well yeah, mean, ultimately before somebody really picks what they do, they're gonna, most people will pick like incentive over curiosity, right? So when I was going through undergrad, you know, it was like working at a giant tech company was like the thing. You it was like, you worked there for seven years and you're an automatic millionaire. And that was like, oh shit, that's actually kind of sweet, right?

So, regardless of what you want to do, there's always going to be like incentive that outweighs that. So I think that another really interesting angle of re-industrialization is that when you basically like upgrade, you know, the industrial base to this sci-fi future, you can actually pay people more, right? Like when productivity is multiplied by orders of magnitude. So you might need less workers per factory, but like who cares? Factories become cheaper, they produce more, know, like build more factories. Ultimately, it's just like, it's not a fixed pie kind of thing.

But where I'm going with all this is like, if building the new industrial base in this fusion of new skills and everything becomes the most prestigious thing to do in the next 20 years, that's amazing. Because now you'll have a whole wave of really, really smart people who are heavily incentivized to go into that. And all of those skills are still really important. Being a good programmer and being a good engineer, like, that's not gonna go away anytime soon. If

anything, AI will just augment your ability to do more. So I think ultimately, those are still really valuable skill sets no matter what…yeah, I mean, I don't think that's going away anytime soon.

Stephen McBride: Aaron, and now we're coming up on time here and I want to be respectful of your time. I'll just a few, a few quick questions to close. Who is the most impressive manufacturing company in the world?

Aaron Slodov: Huh. I mean, I'm pausing because I think of a few companies, I guess, right, that like come to mind. So obviously what Elon has done with his companies is pretty amazing. And then I also think about companies like LEGO. I don't know, people don't really think about this one, but like all of LEGO's success and their ability to, you know…

Stephen McBride: Mm-hmm.

Aaron Slodov: What they've done was initially based on their skill in mold making. They built their entire empire on injection molding and being able to build molds really well. In my mind, I think that's just like really fascinating that if you are hyper-dominant in a skill and you find a good application for it, like Lego is kind of the outcome there, right? It's like nobody could touch them.

Stephen McBride: Hmm.

Aaron Slodov: So I think that that's fascinating and I put them very high on my on my list right and then like, you know Toyota or even like Ford and GM and you know Chrysler. Like the big three they're fascinating because they have mastered like ultimate mass production, right? And they're really good examples of this that like happened over the last ten years even where people were all kind of like trying to blitz like new electric SUVs or something, right?

Like I specifically remember this where Tesla announced the Cybertruck, Ford announced like the new Bronco they were gonna come bring back, know, like resurrect from the eighties or whatever. Rivian was gonna come out, like we had all these cool new trucks that were gonna come out and guess who won? Ford, right?

They got to mass production faster. And why do you think that is? Because they're really good at it. So I think that like, you can take a lot of these different aspects of how good you are at something and apply it, you know. Ultimately, that's kind of like what I respect the most in terms of like being the most impressive manufacturing company. So they all have really amazing depth.

Skill to them and like Elon is the one figuring it out the fastest like in real time even though it takes him like a few years at a time to do stuff like… The rate at which he's been able to

accelerate manufacturing and different things right like the Starship Factory down in Texas is… Once we actually finally get a look at that, it's gonna be bananas. You know like being able to make a thousand of those a year is just mind-blowing. He's I think he has kind of like, you know mastery of—

Stephen McBride: Crazy.

Aaron Slodov: Production, you know, as kind of like his thing.

Stephen McBride: If you had to be max long one startup in the reindustrialization space, whether it's actually making something or whether it's like you guys making the molds or the tools, the machines that make the machines, who would it be?

Aaron Slodov: And I can't pick myself or can I pick myself?

Stephen McBride: You're max long, you're max long atomic already.

Aaron Slodov: Man, it's a good question. Hmm.

Stephen McBride: Or you can build the Aaron Reindustrialisation ETF and mention three.

Aaron Slodov: Well, mean, yeah, there's gonna be a lot, right? Like, I like...man.

I will say that I probably like Valor a lot because of their kind of like dual nature. Like I think they will probably split an atom first, but I also like the fact that they're gonna produce a fossil fuel. Right, like I can use the byproduct of that to make plastics and stuff, which is kind of cool. Plus use the energy at the same time. And then, yeah, maybe like.

Maybe Hadrian, maybe Rangeview, maybe, like, I'm more biased, like Machina Labs, you know? Like, I'm way more biased to the people that are making parts. So, my ETF would be kind of like, you know, energy, raw materials, and parts, basically. So, like, mining companies, energy companies, maybe energy companies that make raw materials too.

And then people that are making parts. That's like my ETF would be something like that.

Stephen McBride: And finally, just leave us with a dose of optimism. You we talk about reindustrialization and often in a negative light, America has lost its way, but it seems like, you put on the great reindustrialization conference recently, there was real energy in the room, real people building real stuff. So just leave us with a dose of optimism for the next decade of manufacturing in America.

Aaron Slodov: Yeah, I mean, I think that, you know, your very first opening question, right? Like, is this a time…is the will here for it? Like, absolutely. And I think everybody sees this. I

think it's a hugely bipartisan issue, right? Like, I think the last wide-scale survey of this was like 85 % of Americans would like to see more things built in America and manufactured here, which is incredible, right?

And I think that both political parties understand the value of this. So it's going to come down to, you know, a handful of people, you know, pushing, pushing on this stuff while everybody else is like busting their ass, basically. So I, I'm, I'm really optimistic about, you know, where things move.

I'm really optimistic about like on the policy level where things will change as well to favor, you know, domestic manufacturing and new trade skills being developed. And obviously, you know, defense has a fire lit under its ass, to do, to do a lot of this stuff. So, hopefully we see right, like procurement changing and moving faster. see, applications going from concept to, you know, production much faster.

And then ultimately, maybe new technologies arise out of this, right? That like can be used in a dual-use way. So for commercial use and defense use also, I mean, like I'm super intrigued by what the industrial base will looked like in 10 years. So I think it'll be a much better world though. Yeah.

Stephen McBride: Aaron, thank you so much for time. Where can people find out more about what you're doing, what Atomic is doing, and the reindustrialization movement?

Aaron Slodov: Probably on my Twitter or X or Twitter. My handle is @aphysicist.

Stephen McBride: Awesome. Well, again, thank you so much for time and I guess I'll see you in Detroit next year.

Aaron Slodov: Thanks, Stephen. All right, thanks a lot.