

The Rational Optimist Podcast

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Stephen McBride: The real cutting-edge innovation still happens in America by American entrepreneurs. But I think as regards to deploying that technology across the world, especially first-of-the-kind stuff, whether it's what you are doing with Cuby, whether it's nuclear reactors, drones, robot taxis, so on and so forth, there's actually no better place than in the Middle East, specifically the UAE and Saudi. And I think that's that's an incredibly valuable, you know, first place to deploy.

Aleksandr Gampel: So funny enough, we spent quite a bit of time with the third-largest home builder in Saudi Arabia. And they were the first to bet on us and say, "look, you guys have this massive supply chain in China. You have a big team. We've been having a hard time breaking into the Chinese construction market, meaning we want to source materials from there, but you've got to roll up your sleeves. It's not easy." They are giving us a very large contract, you know, a 10th of a billion-dollar contract to supply materials for them.

So I agree, folks are willing to test and are willing to take risk, even though they seem conservative, they're willing to want to be progressive as much as possible. So I think the Middle East is a very interesting place in the world right now.

Stephen: Talking about building stuff, Elon builds Colossus One in 122 days. I believe it takes twice as long to build, on average, a single-family home in America today. Why? What went wrong? Tell me what went wrong.

Aleksandr Yeah. That's a whole separate, maybe four-hour podcast, but to me, there's really, let's take a step back, I guess.

It's not crazy to assume every market right now has a housing problem, right? Construction - massive sector. Everyone knows that it's generally the biggest contributor to most economies, GDP. Housing specifically, massive, massive problem, no different than the US or Ireland or Dubai, et cetera.

Just mainly first-world economies are running into an issue where we're not building enough housing relative to the amount that we need, and a lot of the existing housing stock is depleting out of existence essentially.

To me, there's two reasons. One is regulatory. Not even Donald Trump can fix the regulatory problem at this point. There's just too much regulation in the way between a developer wanting to build and making those economics work and physically building. So regulation is one, and it's just gotten worse and worse and worse and continues to get worse.

And the second reason is to me, there's just not enough skilled labor. Statistically, in most first-world economies, you have this skilled labor force, which is highly apprenticed, meaning it takes many years to ramp up to a certain skill level, and it's retiring at a pace much faster than it's being replenished.

In the US, the statistics are in the range of somewhat 40% or so of skilled labor and construction is due to retire in the next decade. That means for every seven people that leave into retirement, only one young person replaces them.

How do you solve housing when we're constantly building less than we need, while also having less people to actually physically do it? So that's where we come in. Fundamentally, the question we're asking is, how do you build more homes without skilled labor?

Stephen: Say more. I mean, one of the reasons to be pessimistic about the future, you and I are both dads, right? And I often say to my wife, why do you think nobody's having kids anymore? And she says, a bird doesn't have eggs in a nest, right? One of the reasons to be pessimistic is, hey it costs so much to buy a home, you can't have kids. So many second- and third-order consequences. How are you and Cuby solving that?

Aleksandr: So that's exactly right. I don't think it's crazy to talk about housing as this more existential problem, and it's true. I'm trying to pull something up that I recently was reading, and I thought it was incredibly interesting. Basically, we know this: The lack of skilled labor relative to the amount of demand you can actually go build in terms of construction. It's like a \$2 trillion GDP contribution loss in the US economy. So it's a massive number of loss.

But then you talk about more of this existential problem. And you start to talk about the fact that in 1950, 50% or—sorry, in the 1950s, percent of married and homeowners by the age of 30 was about 50%, right? That same number today is below like 16%, right? That's a really, really interesting stat. That means that folks are delaying marriage, delaying family formation, and it's tied a bit to homeownership because those are correlated.

For developers, the only way they can get their real estate deals to pencil is they keep building apartments that are tiny, right? You have studios, you have one bedrooms. That's the only economics that makes sense. You build on top and create density, et cetera. You can't start a family in a one-bedroom apartment. I did it. Most people do it. It's hard. You have to move at some point. You outgrow it.

That's one really, really important stat. It's just like, when you think about what Elon talks about all the time, and you think about first-world markets, and you see this demographic shift of us just, in terms of birth rates and growth of demographics, it's kind of scary what's happening.

And maybe you can tie it back to the fact that there's this fundamental need of Maslow's hierarchy of needs of food, shelter, et cetera, shelter, housing—really, really important problem to tackle. And it's talked a lot about, but there's been no path yet to solving it at scale.

Stephen: So everyone knows there's a housing crisis. A lot of people talk about it. What I find so interesting about what you and your partners are doing is you're actually doing something about it. And when we had our first conversation a couple of weeks ago, I came away thinking, well, Alex and his team have really thought about this problem deeply. Because there's been tons of startups that have tried to tackle this problem and in large part, they've all failed.

So tell me exactly Cuby's strategy, what you're doing, and how is it different than everything we've seen so far?

Aleksandr: Yeah, so maybe first of a history lesson, right? So if you think about the Soviet Union, the Soviet Union was able to mass-produce large housing blocks all over the country very, very fast. They had a form of precast concrete that's also a form of industrialized construction.

So this idea of you should be able to build buildings or construct or housing, et cetera, in a way that fundamentally resembles manufacturing, right? Ford production line is notorious for giving us ability to lower cost, increase quality and do things faster.

So why not apply that to construction? It seems simple in theory. And this has been the way since the fifties, folks have tried to do it, it's worked and then it stopped working and now folks are trying again, et cetera. The Soviet Union's one example of that. You live in the Middle East, you see concrete housing going up left and right, also precast.

Stephen: Everywhere.

Aleksandr: If you think about the U.S. in the 50s and 60s, same thing. You used to be able to order literally a kit of parts pre-cut, ready to go, that would get on a train, get sent nationally to a different location to be assembled by a local builder or yourself. Sears, you could literally buy, I think it was a \$16,000 or \$23,000 home kit. Adjusted for inflation, I think around like 150K to today, et cetera.

So this concept of industrializing construction makes sense given how construction is done today. The way construction is done today is, it's a highly fragmented function with lots of different third parties who are not incentivized to work well together in a sense. And it's done over a period of months. There's no process information systems. There's terrible logistics involved. And the way to think about really like, let's take building a house, for example, is it's a one-off process every time.

Even if you build house A and house B and they're fundamentally the same, built by the same crew in the same location, they will come out different every time. Imagine how odd that would be if you were buying a Toyota Camry, and you're car 1,607,000, and then someone else buys car 1,608,000 and those two are slightly different. That would be weird in all other industries.

And construction generally today has a productivity gain of about 0%, like 0 to 1% over 50 years. Every other industry is 7X to 8X in productivity. It's a crazy concept.

So we like to joke that the only profession that basically there's a joke that the only profession that would get recognized today, you know, a thousand years later is the, you know, it's like Jesus came back to earth and was like, let me go, you know, find a profession that existed in my day and age or be a carpenter. Fundamentally, it hasn't changed that much.

So anyway, all this to say is we need to industrialize construction. There's been plenty of attempts back then and now, and there's constantly a venture-backed company that's emerging with a thesis, lots of venture dollars poured into the space. But nonetheless, no one has really made a dent. There's a big graveyard of folks.

We took a more practical approach. This maybe stems from my real estate background and understanding fundamentally how to go buy, invest, build into a building, and my partner's background, which is really 20 years of taking very complicated hardware and in quotes, "deep tech" and mass commercializing.

So it's very easy to go and make a prototype to go design something for the first time. It's very hard to build a process and system to mass produce something at scale. I would say that's a lot harder. And there's a really famous individual who talks about this all the time. I'm sure you can quote him, Mr. Elon, our friend.

But basically we took a fundamentally different approach. We said, "look, putting up a gigafactory the same way that say Tesla or any other mass-produced product in the world is built doesn't work for an industry where you're talking about a product that, at scale, is millions of square feet, millions of tons having to be shipped thousands of miles.

So investing, you know, a hundred million to a billion dollars in a gigafactory doesn't make much sense. Why? Because A, you're betting that there's going to be infinite real estate demand to cover that level of CapEx investment into that factory. But unfortunately, real estate works in cycles. So you don't always get that demand and you don't always get to cover those costs. You end up going out of business out of a gigafactory.

Two, because you're producing at scale such a large quantity to make your economics work, your product can't be customized. It has to be kind of a fixed product which doesn't really work well for the real estate industry which is requiring mass customization, different sites, different codes for building, different preferences of local market, etc.

And then more importantly, you're having to ship millions of square feet, thousands of miles like we discussed on an oversized truck. One fundamental rule in logistics is you don't ship air. This is by definition creating a volumetric box potentially shipping air at scale. And when that box or those kit of parts, i.e. the building, arrives to the construction site, it's hundreds of miles away, where a third-party general contractor and all these subcontractors have to figure out how to physically build it because they're not part of the system. You're just a cog that sold them a kit of parts or the elements of a building, they have to figure it out. They make a mistake, you're back to that thousand-mile feedback loop.

So all this to say, our big fundamental thesis was around decentralizing manufacturing. How do we put up a bunch of smaller factories in a bunch of local markets? We're talking hundreds of factories in local markets to service a much smaller radius. Therefore, we need much less output to make our economics work. Therefore, we tie into more local code and preferences, et cetera. So our business is about mass-producing our product, which is a mobile micro factory.

I assume you'll be writing this. I don't know if this will be a podcast. I don't know if something in between, but it's always hard to explain what a mobile micro factory is. But the simplest thing I could say is it's a factory in a box. We've containerized the factory out of out of about 10 dozen shipping containers where we embed a lot of our machines and hardware.

We quick deploy those containers on a site. About six acres is all we need. We pour a concrete foundation, and we place those containers, and we quick build the factory. All those machines create production lines. We become one giant machine that produces all of the inputs that make up a single-family home.

So we make things, we prep things out of these mobile micro factories. We'll make our own windows, our own framing elements, own helical piers the foundation. We'll make our own

envelope of the house, like the sandwich panels. And then we'll prep everything else, like the sheetrock or the closet behind you, or OSP for the wall for piping, pex pipes, et cetera.

So we make and we prep, but the idea is we touch a home end to end. So we make all the parts to a home, like Lego pieces. And when we palletize those Lego pieces to arrive not thousands of miles, but last mile down the street to where that actual build is happening. And what's unique about us is we're hired by a developer, turnkey.

Stephen: Hmm.

Aleksandr: We're also the general contractor. We're the subcontractor. But the big thing tying this back to what we originally discussed is we do all of this without skilled labor. Our belief is reduction in skilled labor ultimately leads to reduction in cost because it's the most expensive piece of that coefficient that it costs to build a home. So we're basically we've created a hardware and software system that allows us to make all the elements of a home and assemble on site in a very traditional familiar way deceptively.

And that's very important because that takes me to pillar number two. A lot of groups that have tried industrialized construction, they're not familiar. They reinvent the wheel. Reinventing the wheel in a very conservative industry doesn't work. There's too much regulatory barrier, which is around building codes, i.e., someone has to tell you how to build legally. And it's really a comprehensively documented thing.

Just in the U.S. alone, there's 26,000 different ways to build a house based on different zip code jurisdiction. So, familiar is important, building on-site is important because you don't want to fight those regulatory hurdles.

The second thing is, familiarity matters for incumbent industries because developers, home builders, they're conservative. They answer to lenders, they answer to limited partners, investors. So, the more perceived risk you can introduce, the harder it is to sell into that ecosystem. So, for us, the second important pillar is familiarity. We do things the way they've been done. Slightly different process, but fundamentally same end product. And we can make our homes into hundreds of iterations of shapes, sizes, layouts.

The third and final pillar is around costs. No one today in industrialized construction is cheaper. That is very important. This doesn't scale like Tesla. This isn't first Roadster, people overpay, then that gets you to Model 3 and Model 3 is the economic choice, et cetera.

If you're not day one at cost parity in this industry, you're completely irrelevant and you die. And that's been the case to date. We told ourselves if we can't build around \$100 a foot in self-cost to us from foundation to finishes, labor plus parts inclusive, we are irrelevant. To

give you context for maybe Ireland purposes or like Middle East, we're somewhere around 300 to 400 euros per square meter in self-cost.

So yes, fundamentally our business is that and our customer is a developer, home builder, we're a B2B solution and our goal is to launch about 275 of these factories and we do that in partnership where we look like kind of like McDonald's if you will and it's not crazy to think about from day zero coming up with a system to do this 275 times. Again, look at McDonald's, there's 40,000 locations. Look at Lowe's and Home Depot if you or your audience will know what that is. Between those two, there's 3,000 local locations. So it's not crazy to think about that and that's really what we're gunning for.

Stephen: You are the Ray Kroc of housing. I've heard you mentioned McDonald's a couple of times. Is there any kind of off-the-beaten-track businesses that you've taken inspiration from? Like kind of non-traditional real estate? I guess McDonald's is a real estate business at its core, right?

Aleksandr: Yes, so this gets into like a very deep master plan, and it's in three phases. Phase 1 is we have to become the infrastructure for home building. That's really how we think about ourselves. Even how we capitalize each factory, we are infrastructure at the end of the day.

The goal is to put out 275 mobile micro factories. Once we do that, the infrastructure is out there to build 200 homes per year at 150- to 200-mile radius per each mobile micro factory. That's phase 1.

Phase 2 is we eat about 550 different SKUs or bill of materials by each mobile micro factory. It's about \$25 million worth of materials per year. That means, phase 2, we can supply \$7 billion worth of materials to our own factories. That's a whole separate business and we've gotten quite good at that supply chain piece.

Phase 3 is we want to eventually become a home builder. We want to buy big tracts of land. If we're the best builder in the market, why not go and off take from our own factories? That's phase 3. And that gets more into this know, land slash box on top model.

But the McDonald's analogy really stems a little bit kind of, it's really a different analogy. McDonald's is the best process systems company in the world when it comes to repeatability and our opinions. The way we've developed our standard operating procedures, our system process for launching factories is going to look no different.

Also the way that we're thinking about owning the land under each factory and doing a sale leaseback and pulling dollars out also mimics that. But I wouldn't say McDonald's is like our only analogy. The way we've triangulated for simplicity purposes, what we're doing is a

combination of Toyota's production system, IKEA, or, you know, on-site assembly, McDonald's for somewhat of the business model. So there's really a couple ways we can triangulate a lot of what we're doing.

Stephen: If I walked into one of your mobile micro factories, what's the most shocking or not even shocking, which is the important things that I would see in there that I'm expecting to walk into somewhere which builds homes, how is your mobile micro factory different?

Aleksandr: Our patent would dictate this, not even me, but no one's ever done this in the world before. You're walking into a factory that can pack up in two months and leave. A full production factory. No one has fit the machines we fit into intermodal containers. You know, ISO 40-foot, 20-foot intermodal containers. No one has been able to deploy factory in such a manner where it's one giant machine rather than a building. So there's a lot of nuances to what we've done.

It will shock you the size versus what we got into it and what it's actually able to output per year. It's an incredibly efficient system. And it's built for mass scale.

Stephen: Talk to me about some of the materials you build with because people think, "if it's not artisan, if it's not the old way of home building, hey, it's cheap. I don't want it. It's it's cheap. It's kind of mass-produced cookie cutter. I don't want it." I know that's exactly not what you're doing. So just say more about the unique materials that you've invented and all the all the little cool things along the way.

Aleksandr: So we haven't invented any materials. That's important to remember back to the familiarity and also has to do with supply chain. We're part, you know, everything I've described, but part supply chain company to be the best in the world at what we're going to do. We have to be a very kind of top 1% logistics supply chain business. To do that, you can't have proprietary supply chain. Otherwise you get stuck because we produce just in time, meaning we consume materials on an eight-week basis.

Basically, we can't have some sort of proprietary vendor not exist anymore. That makes sense. So none of our materials are proprietary. We have ABCD pipeline of sourcing channels, meaning we always have backups or vendors, et cetera, and OEMs and whatnot. So that's an important nuance.

I will answer your question a bit differently, and I will cater it to the US market. The top 10 production home builders who build, you probably 50% of the million homes a year that get built in the US, so single-family homes. Their margins are being squeezed. The market is interesting. Interest rates are high.

Basically, we need a lot of homes, but home builders are stuck. It's just this whole mess. But basically, their margins are struggling. They promise not to lower quality and cut corners. They say this publicly on all the earnings calls. Ironically, there's research that came out around every single market that every top 10 home builder builds, there's been a spike in lawsuits around quality.

So when you talk about quality for how homes are built in the US today, they're horrendous. In that same article, there's a stat that said that there's a person that was quoted, a research organization that said that out of—there's several inspections that happen when building a house throughout different stages of it. This person said, I guarantee you that any home built in 2025 and beyond or something like that, at least he said, I will 100% bet that at least one of those stages is not code compliant to actual code standards. Meaning the cutting corners is not just like a finishes thing. It's like a safety issue at this point. So the homes built today suck.

By definition of lean manufacturing and industrializing, the quality gets increased because you can't make mistakes. You don't move on to the next step until the previous step is done correctly. On top of that, which is what we do, on top of that, we also can afford to use materials that are a bit more elevated because of our reduction in skilled labor, which means we have more margin to play with around materials.

For example, typical home in the US is built using lumber. It's stick-built, as it's called. We use steel tubes and rivets for our structural framing. Like it's a steel house out of steel tubes, not like gauge steel, steel tubes. We use also sandwich panels that have super high R and U values, meaning efficiency, efficiency values related to a home to enclose the home. We always use triple-pane windows. That's reserved for super high-lux homes generally. That's standard for our homes.

So our homes are really nice quality, but we're not gunning to be priced at the high end of the market. We have no interest in being Ferrari. We want to be the Camry of home building. 99% of people, best bang for your buck. That's really what we're gunning for.

Stephen: I know obviously building a house is a whole lot of hardware but you've invented an incredible amount of software in this. Talk to me about how you use software in the business, how that's really the key enabler of what you do.

Aleksandr: None of this can happen without vertical integration. To date, we haven't taken any software from the outside ecosystem. We believe in building all of it ourselves. We have a 30-person software team at this point. There's a big pipeline of software that we're building, but the biggest maybe summary of what I can give is it's an operating system for both inside the factory and how does that get extended to on-site as well.

Think of our entire factory as powered by this suite of software to enable unskilled labor, to enable management, to basically enable a turnkey operation of the factory from like material procurement to software to help you distribute the kit of parts and time and batching and essentially like to site, et cetera. Think about augmented instructions for unskilled labor on site. It's too much to go into on a call, but it's really, it's an enabler to the hardware.

Stephen: Tell me about, you know, we kicked off the call by talking about prefab and 3D printing and these other methods that people have tried. Maybe just, you know, in five minutes or so, tell me why 3D printing, why prefab, why modular, the approach has not worked. What's the kind of key failure points?

Aleksandr: Let me preface this with my opinion because everyone has an opinion. This is solely my opinion. And I'll also preface this that the market is massive. I hope many of these concepts win. It's good for everyone and just more housing gets built, construction becomes more efficient. It's a win-win for everyone. So I hope the entire industry advances globally.

That being said, let's define—and there are different ways that folks define this—but to me modular is an overarching concept, but I really place modular and tied hand in hand of volumetric modular, which is imagine you produce entire rooms or entire buildings off-site. So think square boxes that get shipped to site stacked on top.

That's been challenging. There's a lot of regulatory issues there, market to market. So it doesn't scale well. Also, when you produce a box, you don't have as much variability around customization. It can work well in markets that are regulatory accepting of it, like Japan or the Nordic countries have been wonderful with volumetric modular.

But also it's a bit of a logistics challenge. You have to send those oversized boxes that's shipping air to site, sometimes across oceans, across state lines, et cetera. But when you're physically shipping them on US roads, you need escorts and oversized trucks because they're wide, more than a certain width. And then to add to that, it's really tough around, like I said, customization.

So really the asset classes it works well for are highly repeatable in nature. Think student housing or hotels where you have same rooms stacked on top of each other, et cetera. Can work well there, should be okay. Doesn't work well for single-family housing.

To me, prefab, the next iteration is a deconstructed house or building. So it's whether you're producing all the kit of parts like us, or you're producing, say, just a wall panel. That's prefab. I think that's the right approach. It makes the most sense. I think most folks would agree. There's nuances to how to do it. But I think that's the right approach.

3D printing is an interesting one. I think a lot of venture capital has gotten excited. I am less bullish on 3D printing. It kind of is the contradiction to all the three pillars I've mentioned of why we exist, which is familiarity, cost, et cetera, and solving around skilled labor. 3D printing essentially prints the framing, the walls of a house.

Framing is 10% of the construction process. That means even if you got it cost-effective, fully right, there wasn't eight people operating a printer, but say one, it got to its perfect vision plan, right? You're still just fixing 10% of the home-building process. You still need that missing skilled labor to come in and do 90% of the build. So net net, fixing 10% doesn't lead to that ultimate cost savings that matters to enable developers to go build more homes, to create more supply, to extinguish some of that demand, to lower cost.

Stephen: Alex, I could talk for at least an hour and a half now. Unfortunately, I do have to go in a couple of minutes. I want to end with two questions. I know you come from a real estate family and a real estate background. Who, in your opinion, is the greatest real estate dynasty in history?

Aleksandr: Ooh, and that's an interesting one. There's like my taste and then there's like objectivity. I think the best master plan developer in history was Howard Hughes. There's going to be, I think, interesting things that happen with that company over the next couple of years as they relaunch in a certain way.

And then when you think about development, it's always a local game. So it's been really interesting to see some folks extend beyond that local game through generations into national players. For example, the Heinz family, right? The Heinz organization is an international and national developer. That's not a very easy thing to do. It's almost an oxymoron to being a real estate developer.

Stephen: Final question. When we record the fifth follow-up to this podcast in five years or 10 years from now, Cuby is successful. You've achieved your mission or you're on your path to achieving your mission. What does the world look like? How is the world different for the average person that might be listening to this podcast?

Aleksandr: Our dream is to build more homes than anyone has built in a single lifetime. So as ambitious as that seems, if we get this right, we're less than one and a half percent of the US home building market. So as much of a dent we'll make, we probably won't make as big of a dent.

So we have to start thinking bigger. But our hope is that at some point, as we get to master plan three, we hope, you know, part three, we hope that it's as easy to go order a home, buy a piece of land and, you know, customize it like you would order a Tesla. That's really the

ultimate dream, although we don't pitch it very much. So we want to make it very easy for any family to be able to buy land, build a home in a matter of three months and move in.

Stephen: Cuby—you're not only building micro factories that make houses, the factory that makes the houses, but solving the fertility crisis too.

Aleksandr: Yes, hopefully indirectly, yes.

Stephen: Yeah. Alex, thank you so much for time. We'll be sure to do a follow-up soon.

Aleksandr: Thank you, Stephen. Thank you.