 Today's episode is about a question I've been thinking about a lot over the last few months, not only because it's a question very close to the heart of the book I'm working on, but also because it's a question I've been thinking about and writing about for probably more than a decade. And that question is, why is everything that matters most getting so damn expensive? Since the year 2000, the inflation-adjusted price of television sets has declined by 90%. TVs, flat-screen TVs are way cheaper than they used to be, especially when you're looking at the exact same television because TVs get better year by year. The price of electronics, like smartphones, has declined. Toys are much cheaper, simple furniture much cheaper, but the price of healthcare has gone up faster than just about anything else. Education has gotten more expensive relative to wages. The same is true for childcare, the same is true for housing, especially in America's richest, most productive cities. Now look, TV, toys, they're great. I love TV, I love toys, but they're not as important to human life, to human flourishing as hospitals, schools, or houses. So it really is, like everything that matters most is getting more expensive. I think that this affordability crisis in America is at the heart of a lot of dissatisfaction in this country. It just sucks, I think, to feel like elites are telling you that the economy is good and progress is great and yay science and yay technology, but you can barely afford rent or your mortgage and the hospital bill could send you in a bankruptcy and you're $40,000 in debt from college and it's not a position from which it's safe to root for progress or the saddest quo. It feels more like a state of disorder, like something in the system has gone terribly wrong. And that last bit, that's not a conspiracy theory. Something in the system really has gone terribly wrong. If you live in a city, you'll be interested to know that we now build urban transit, like subways, much slower than we used to. If you live in the suburbs, you'll be interested to know that we build highways much slower and much more expensively than we used to. Highway construction costs tripled between the early 1960s and 1980s and then they just kept rising. If you like using electricity, you'll be interested to know that we build energy infrastructure like transmission lines much slower than we used to. We build skyscrapers

slower than we used to. We build houses slower than we used to. On a population adjusted basis, the 12 worst years on record for new home construction in American history were all between the years 2008 and 2019. Something has gone terribly wrong and it is weird that in the same period that everything in the digital space, everything that's made contact with software and computer chips has gotten faster and more efficient in the last two decades, while everything in the physical meat space has gotten slower and more expensive.
Brian Potter is a writer and a kind of internet historian of building things in America. He's the author of the newsletter, the Fantastic Newsletter Construction Physics. And today, Brian and I talk about the golden age of building stuff quickly in America, why we are now in the sludge age of building stuff today, why it's so hard to innovate in the construction industry, and why this question of building things and building things quickly matters so much.
I'm Derek Thompson. This is plain English.
Brian Potter, welcome to the show. Thanks, Derek. It's great to be here.
You have written that the U.S. seems to build things much more slowly than we used to. So, for example, the average time to construct a nuclear power plant in the U.S. rose from about four years in the late 1960s to about 14 years for nuclear power plants completed this century. Well, you look at apartment buildings. The average time required to build a 10-unit apartment building went from about eight months in 1971 to 15 months today. And we're going to spend
the next 45 to 60 minutes talking about why this has happened and why it's so important.
But let's say we didn't have 60 minutes. Let's say you had 60 seconds. What would be your 60-second answer to the question, why does the U.S. build things slower than we used to?
So, at a very high level, I would say it's basically a case of we've steadily made it more and more difficult to build things in the U.S. with rules and regulations and that sort of thing and have not had commensurate technology and productivity increases that have kind of been able to offset that. So, the regulations and the difficulties and stuff like that just kind of adds more and more and more burdens over time and there has not been an offset technological improvement to sort of counter it. I'm going to take that answer and I very much appreciate that it was so much less than 60 seconds as a kind of table of contents for our discussion. We're going to talk first about rules and regulations and then we're going to talk about why, as you put it, I think so clearly, innovation has not increased as fast as rules and regulations have increased. So, let's start our analysis with a very specific example. Let's talk about New York City skyscrapers. The Empire State Building was built in about a year in 1930. The Chrysler Building was built in 20 months in 1928. You take the largest skyscraper completed in New York City this century, the One World Trade Center, that took eight years to construct about six to eight times longer than skyscrapers built 90 years ago. So, to get us started, Brian, when did New York get so slow at building skyscrapers? So, it's really kind of been, if you look at the data, and this is data based on a large database of just skyscrapers constructed in the U.S. over the past century, New York, of course, has a lot of skyscrapers, so there's a big juicy data set to draw from. It's really kind of a steady increase. The Empire State Building is actually a huge outlier. If you look at terms of a square foot per year, because it's such an enormous building that was built just so, so, so quickly. So, that really kind of skews the construction speed upward by quite a bit. But outside from that,

you see kind of a pretty high construction speed up until like the 1960s. And then starting in around the 60s and the 70s, then you start to see a pretty big decline. And it's slowly, it's kind of been tapering down since then, but brightened kind of the 60s, 70s, is when you see kind of a big jump in New York skyscraper construction specifically. Before we get to the great slowdown, I just want to hold on the Empire State Building, which is so famous in this space for being essentially the best example of a building we built really, really, really fast. How did we do it? How did we build the Empire State Building in just over a year? So, the building was basically designed from the ground up to be really, really fast to assemble. It's funny, if you read like sort of descriptions from the architect at the time, they're like, and they're talking about the design of it. It's like, we didn't basically think about the design of it at all. We basically, the design is a reflection of the fact that we sort of, all the elements were arranged to sort of make it build, to be able to build as fast as possible. And the sort of design, the actual, what it looks like is essentially just a reflection of that. So, they basically, they use like off the shelf parts and sort of very standard components wherever possible. There was not really any sort of custom materials or custom shapes or connectors, stuff like that. It was mostly sort of off the shelf. And they arranged those components in such a way that they could be just put in really, really, really quickly and repetitively. They used like the exact, they had like a really small number of windows that they used to use, the exact same window design over and over and over again. They had these sort of exterior panels that were arranged to sort of drop in really, really quickly. They had done, they did stuff like they had this sort of, you know, mine cart situation they set up on every floor. And because this was, of course, the days before forklifts and stuff like that. So, they would like raise the materials up. And then this mine cart situation would bring it down to sort of where it was needed. So, basically, the whole building was essentially designed from top to bottom to be really fast to assemble. And they just executed really, really well is, of course, the other part of that. And now we're in the great slowdown where skyscraper construction is getting slower in New York and other cities. How dramatic has this decline been? How much slower are we building skyscrapers now than we used to? And please, use the most fair apples to apples comparison here. Maybe something like square foot per floor. So, on average, it's maybe like a little bit less than half the speed that it was in like the 60s and 50s and stuff like that. It's a pretty, in terms of like square feet per year on average. It's a pretty, it's a very substantial difference.

And let's say that timing is suggestive. And this is a leading question because it's my theory that this timing is very suggestive. I think a lot of things happened in the 1960s and 1970s on the regulatory and rule side that might have directly decreased the speed with which we built stuff like houses, nuclear power plants, and New York City skyscrapers. Walk us through what 1960s, 1970s changes you think are most important in explaining the decrease in building speed? So, in the 60s and 70s, you just, you really see this huge sea change overall in like what the government was going to be responsible for and how they should intervene in society to, you know, to try to make it safer and to try to make it better and to try to improve it. So, you just see just a huge increase in regulatory, you know, burdens, you know, burdens is perhaps biased in the answer a little bit, but a huge increase in just regulations across the board. Environmental laws are like a huge one, right? And of course,

those have had huge benefits, right? Like environmental controls on coal power plants have made the air much, much cleaner, have reduced the health costs of those plants enormously, but they did have a huge impact on like the cost and the time it takes to build plants like this. You know, the National Environmental Policy Act is the environmental law that basically makes us do environmental impact statements, environmental reviews for any big federal project. That also came in the 60s and 70s, you know, Clean Water Act, all these, you know, acts to prevent or pollution of like streams and rivers all come, you know, the environmental movement is really ascendant in this time period. And then you also have stuff like OSHA, the Occupational Safety and Health Act, I believe, comes in the late 60s, which dramatically increases federal regulation of like, you know, work safety, which again has had really huge benefits. It made construction much, much safer. But again, these things have, you know, have basically made things just a little bit more difficult to build things. Then the mid, early 1970s is when, of course, you have the energy crisis. And that's also when you see building codes start to get much more strict. That's when you start to see a lot more state adoption of building codes and then start to include like energy efficiency provisions in them and stuff like that. And kind of, you know, once you have these rules, they just kind of wrap it up or ratchet up in stringency over time. Yeah, so that's about the, that's sort of a high level look at it.

Yeah, I think it's a very complete answer. I mean, we could talk for hours and there are many hundreds and hundreds of page books that are about this moment in history, which is incredibly successful on the first order basis of cleaning the air and cleaning the water, getting pollutants out of the biosphere in America, reducing lead exposure, making it much, much safer to work. I mean, you had this statistic from your newsletter on the state of ironwork in the 1910s that found that in 1912, the International Association of Bridge and Structural Ironworkers had a death rate of 1,000 per 100,000 workers. That's twice the death rate of US soldiers in Afghanistan in 2010. So work in this golden age of building speed was incomprehensibly dangerous compared to what construction work or manufacturing work is today. And so there's a big thorny story to tell here, but one executive summary is that we pass all of these laws, environmental laws and work safety laws, the 1960s and 1970s that succeed on the first order basis of cleaning up the environment and making it safer to work, but have these second order effects of dramatically slowing down the rate of construction and making it harder to build many of the things that are most important to build in the 21st century, not just skyscrapers, but also apartment buildings. And while we might not touch on it in depth, energy mega projects and transmission lines as well. I want to move through this regulatory story because I think it's really important. But one thing that I think your work does in a really original way is point out that even though the regulation story matters a lot, the innovation story might be just as important. So let's tiptoe into innovation in this way. If you take a field like agriculture in the US, the US saw productivity advances in agriculture that have absolutely changed the planet. Like in the 1800s, more than half of American workers worked on or around farms and today just 2% of the economy is devoted to agriculture. And yet we have way, way more food and much, much better food. That is a productivity success story in agriculture. Construction, by contrast, is one of the only industries that has by some accounts seen its productivity decline. So let me put it to you this way. Why did agriculture mechanize in a way that advanced its productivity while construction did not?

Yeah, it's a very big thorny question to answer one. The very high level answer to that question

is there are specific things that you can do to make a process more efficient, to produce something more efficiently using less time, less energy, less resources. And all of those things are very difficult to do in construction. I mean, you talked about one of those is mechanization, is take what used to be labor intensive, take a lot of manual labor to do, find a way to make a machine to do it. It's very hard to mechanize construction tasks. People have been, people have been trying for, again, like decades. And it's just they've had very relatively little success for it. The biggest impact is probably things like power tools, but those have a relatively, the impact of those is relatively narrow. It doesn't improve apparently a productivity all that much. It still requires a worker to hold the power tool, of course. It doesn't remove the labor from the job site. I wrote a long essay looking at the history of brick robots, brick lane robots, because setting bricks, it seems like the perfect task to mechanize, to automate the solution, because brick lane is so incredibly repetitive. You're putting an identical brick down over and over and over and over again, thousands and thousands of bricks, even on a small house. We'll have thousands and thousands of bricks on them if it's made with brick. It satisfies the three requirements of things that seem like good candidates for automation, which is dirty, dull, or dangerous. It's all three of those things. Bricks are really, really heavy. It's very stressful for the workers to have to lift these things all over again, over and over again. And people have been trying to build a mechanized brick lane system for decades. And they have systems that can do it. There's robots on the market that you can get that will set a brick for you, but they basically don't really work as well or as cheaply as just a person setting a brick. So when you have bricks or concrete masonry units or stuff like that, that really have not been able to automate that yet. It's still a manual task, depending just despite the decades and decades and millions of dollars that's spent trying to automate it. Make me smarter about why. Help me understand why it is that robots can build cars, but they can't build houses. Obviously, I know the difference between a car and a house. I know that one is bigger than the other. I know there's all sorts of differences between a car and a house. But explain to me at the most tactile level possible, why can't robots build houses?

So when you're trying to mechanize or automate some tasks, there are essentially two parts of it. You have the actual physical thing you're trying to do. I'm going to physically move this brick from point A to point B. And you also have an information processing component where you sense what is going on in your environment. And you take that feedback and use it to modify your actions as necessary. So the brick is maybe a little bit to the left or a little bit to the right. And so I adjust my grip to put it where it needs to be and put the brick where it needs to be. If the wall is bowing in and out a little or the wall comes up to a corner, I can change the actions that I need to do based on the feedback and how things are going. At a very high level simplification, automation is very good at automating that physical part of it. And it has historically been not nearly as good or competent as that automating the information processing part of it. Making the actual decisions, responding based on feedback to the environment, is something that automation is starting to get a lot better at with things like self-driving cars, which can of course respond flexibly to their environment.

So historically, what you see with automation is that you figure out the exact movement or sequence of actions that you need to take and you set it up so you can just perform those exact motions over and over and over and over and over and over again without really having to sort of

modify them very much. So if you look at like agriculture mechanization, it's like these simple machines that sort of do some very, very repetitive action. And in that action, they're able to sort of filter out the sort of plant, the fruit of the plant from the sort of rest of it, because there's like physical differences between the plant that you want to harvest and the other part that you plant away. And you can make a repetitive machine that sort of can act on those differences. But a combine that's harvesting wheat or corn or something like that, it does not work in the same way that a manual farm labor harvesting the corn would work. It doesn't like pick, reach out and pick each individual ear of corn. It sort of just does this repetitive motion and it filters the corn out from everything else. The plants that you and the sort of agriculture that can't do that, but where you do need to sort of have an information processing component where you need to sort of pick and choose exactly where you need to move based on where the plant is and stuff like that, those have been much, much harder to develop. So like corn harvesting got mechanized in the 1930s or the 1940s. But strawberry harvesting, which strawberries are much more, are as much softer, it's much harder to get like a machine to sort of pick them. That's still kind of an open problem. Those are still harvested by hand.
And so in construction, construction is just has a hard time with that, because that information processing component, it has a hard time mechanizing sort of the actions. Part of that is because each building tends to be unique and different. So you can't just set up your operation to run hundreds of thousands of times or whatever like that. You have to like, you're going to do it to build the building, and then you're going to move on to another building that might be different. Part of it is that it takes place, it's outside in an uncontrolled environment.
So you have to wind and rain and dirt and people moving all over the place. And the environment itself is varying in a way that maybe is not in sort of the ideal automation environment.
And so there's stuff like that is kind of a big reason why.
That's a great overview. Let me ask one quick follow up question. So robotics, it seems to me, based on your answer, has what I'm very, very stupidly going to call a corn to strawberries spectrum from easy to mechanize and automate to harder to mechanize and automate. Are there parts of the house that are more like corn than like strawberries? Are there parts of a typical home or apartment building that are incredibly important, a huge part of the construction costs, and slightly easier to make without so many people?
Yeah. I mean, that's definitely true. And the stuff that is highly automated is basically the materials itself, drywall manufacturing or lumber manufacturing. It's interesting if you look at sawmills, where they take a big giant log and chop it up into dimensional lumber and then that lumber gets dried out and then it gets sent to Home Depot or whatever. That process is very highly automated, even just like the examination of the individual lumber to see where the defects are and see what grade it can be. That is all automated. It's all done with computer vision that can look at it and see where the defects are and what grade needs to be. So if you go out a step back from the actual construction process into the production of materials, that is basically just like any other aspect of production where it's just gotten much more productive over time. And if you look at the cost of building materials, those do tend to get cheaper over time, or at least they rise in costs lower than inflation, which is effectively the same thing. There's a recurring theme of your newsletter, which is that you have this failure

of prefabrication, a failure of building homes and factories rather than building them on site, which would make it easier to modularize, which would make it easier to incrementally experiment and therefore innovate and therefore maybe gain some few efficiencies that could bring down the cost of building a house. I don't think most people know just how popular manufactured homes used to be, that is mobile homes or sometimes called trailer homes. At their peak in the 1970s, the mobile home industry accounted for 20% of new housing units,
20%. Now I think it's less than 6% according to your reporting. What happened to mobile homes or AKA manufactured homes in America? Mobile homes really blew up. Like you say, in the late 60s, they were incredibly popular for a narrow window of time. And then the industry basically collapsed in the early 1970s and didn't really recover. It depends on how you look at it.
And it kind of collapsed for similar reasons that you see factory built housing of more conventional type collapse, which is basically there was a huge downturn in the housing market. And when a downturn like that happens, a normal builder, they can weather it by just like laying off workers and just riding it out. They cut staff and they bring their expenses down. And then when things turn around, they can sort of hire back up. A lot of them are just, they are very, very capital light, very asset light. It's very easy for them to sort of, comparatively easy for them to scale up and down their operations, especially because so much of the work of a typical construction site is subcontracted. With a factory built housing producer, you don't really have that option. You have to pay the rent on your factory, regardless of how many houses you're actually selling. And so a huge housing downturn, these factory built housing producers are faced with like relatively high fixed costs that they keep having to pay. And that kind of sets them out of business. You actually see that in 2008 when the housing market took a huge downturn. Factory built housing producers basically went out of business left and right. And you see a huge decrease in factory, the rate of modular housing. And you see that in like the early 70s with like mobile homes, just a lot of these guys go out of business. And it was very hard for them to bounce back when sort of the housing market turned around. And then you kind of have a couple other things that sort of made that basic mechanic even worse. A big one was just, again, similar to 2008, the mobile home industry, which caters to like a lower income clientele, they had sort of been relaxing their lending standards to try to get more customers for their homes.
And then that really came back to bite them. When the sort of economy turned, they ended of repossessing a lot of these mobile homes. And then so they were in this situation where there is a big actually a glut of supply on the market because there was all these extra home mobile homes that had been repossessed. And also the housing market itself had declined enormously. And then also at the same time, because they'd gotten bit, they made their lending standards much more stringent. So that those effects combined just had a very brutal effect on the mobile home industry. And you actually see the same thing in the very early 2000s, a few years before the sort of broader housing crisis where the exact same thing basically happened. You had mobile home manufacturers extending credit to people who probably couldn't actually afford to buy a mobile home. And then sort of the market turned and they had all these repossessions, which gave this big glut of supply at the exact time and it wasn't needed.
And at the exact time when the lending standards got more stringent. And again,

it just had extremely brutal effect on the market. So that you see that same mechanic repeat actually multiple times in the industry. Yeah, I think it's important to bring in economics here as you've just done for the mobile home or manufactured home industry because we didn't mention that at the top. We talked about regulation and we talked about innovation.
And I do think that those are two absolutely critical parts of the story. But the worst decade for home construction per capita in the last 60 years in the US was the 2010s. And the 2010s were not a period where, oh, suddenly regulation got so much worse or, oh, suddenly innovation fell off a cliff. No, we had a housing crash. We had a housing crash. And as a result, a lot of builders pulled back their construction of single family and apartment buildings.
And as a result, because of the macroeconomics of the Great Recession, we had essentially a decade of under construction of houses. Under construction, especially relative to the fact that this millennial generation, the largest generation in US history, was about to enter their 30s. We're going to need homes to move into as they were moving out of, you know, bunking up with five roommates or living with their parents. They didn't move into a house and we hadn't built the houses for them. And so as a result, what happens? Well, just look at vacancy rates. They're near all-time lows. Look at housing appreciation.
They're near all-time annual highs. So it's really good, I think, to bring in the economic side of this alongside the regulatory story, which is crucial, and the innovation story, which is also crucial. I want to go back to the innovation story. I want to talk about what an innovation moonshot in housing construction would look like. Before we get to robots and ways that we can essentially think about, you know, building a house more like the same way we build a car, let's talk about material science. Like, are there ways in which we could have moonshots for the materials that we use to build a house that might make it slightly more efficient to build good, sturdy, long-lasting homes?
Yeah, I think there's a lot of opportunity there, actually. I mean, you know, very, very roughly the cost of physically construct like a single family home in the U.S., irrespective of like land costs or development costs or stuff like that, is about half labor and half materials. So if you can't address like the material aspect of it, that really like caps how much you can sort of lower the cost and improve the process of building. One big thing that I think, you know, I'm sort of optimistic on is the sort of improving lumber, and it doesn't necessarily seem like it would be an obvious thing that you could improve because, you know, wood comes from trees. You know, we've been building stuff out of wood for thousands of years, right? What left is there to possibly improve. But if you look at like most crops that we produce, right, like almost all of them have been like selectively bred for, you know, thousands of years to have more desirable properties that for what, you know, people want. So to return to our example of corn, if you look at like what corn is now compared to the plant that originally started out as, it's like completely different. It's this huge, enormous cob with hundreds of kernels. If you look at like the original plant, this plant called Teosint, it had like maybe 10 or 12 kernels on it in this tiny little cob that actually shattered when it was ripe and the kernels would like scatter all over the ground. And basically that was turned into modern corn over thousands and thousands of years of just selective breeding of getting, you know, getting plants that had more fruit or more, you know, didn't pop, didn't spread their seeds all over. And they just, people bred those and harvested the most desirable traits for thousands of years and very gradually turned it, turned it

into a plant that was much more desirable from a human point of view. And of course, all, you know, almost all crops are like that. You know, if you look like a modern chicken, it's like, you know, three times the size of a chicken, even just a few decades ago, just from like selective breeding and modern as animal husband techniques. And of course, now we have genetic modification and stuff like that. So there's really huge opportunities from like improving, quote, unquote, you know, plants to sort of have more desirable traits for like human, human use. And we've, we've, we've, we do do that with trees, but we've really only just started doing it. So like corn, like I said, has been in, you know, improved through selective breeding for like thousands, thousands of years. We've all, we're only in a few generations, like two or three generations of doing that for trees. It's really a post-World War II phenomenon. And of course, corn, which like, you know, is harvested every year and you have a new crop every year. You know, trees take 15, 30 years to grow. So it's like a much slower process of, of sort of improving these traits. But you know, you can imagine a tree that like grew much, much faster and then grew much, much straighter and didn't have defects. One big limiting factor on how, you know, strong wood is, is just the defects that exist in the, in the wood. And there's this huge category of materials that are called engineered wood that is basically essentially what they do is they just chop up wood and they glue it back together. And so you don't have these defect concentrations that limit the strength of your thing. There's a whole category of materials that just do that. But you can imagine that if you, if you bred trees to like get that level of strength without having to go through that process or trees that were like, you know, had introduced to be rock resistant or moisture resistant or stuff like that. So I just, I don't know, I can imagine that just trees being, you know, a very intensive tree breeding program or tree improvement program could really, there would be a huge amount of upside in that.

working as hard as you are? Does it foster collaboration, fuel productivity and help build culture? Is it designed with intent? AKA, is it a place you actually want to be with fresh air, natural light and innovative technology? Your office can be a powerful asset. So put your office to work with JLL. Learn more about JLL office solutions for businesses of all sizes at JLL.com slash Spotify. I love the idea that we've spent 5,000, 7,000 years breeding kale and cauliflower and Brussels sprouts and corn to be perfect for our taste and to be easy to eat when you cook it with fire or whatever it was that our ancestors were using to eat these vegetables with. But we haven't spent those same 5,000 to 7,000 years breeding trees, super trees that are perfect for home construction. What is the bottleneck? What's the innovative bottleneck here as you understand it to breeding, as I suppose I'll just keep calling them, super trees that are perfect for home construction? I mean, yeah, that's a good question. I don't have a super clear answer to that. I think just basically the time and expense that it takes to do this, I suspect it would be very hard from like an investment point of view to have some sort of any sort of reasonable return on that. As far as I understand it, and I'm of course not an expert, this sort of improvement is mostly done in universities. And it's had really, so I guess to sort of rephrase a little bit, people are doing this, and it has had big effects. Like a modern tree plantation will produce much more than a tree plantation from like 60, 70 years ago. I just think it's just a higher level. I think that process just could continue. And we can imagine just trees getting better and better and better and better. It's already being done, but there's just so much room to go, I think.

I wonder if another one here is drywall. I mean, are people trying to figure out like better, faster ways to produce some kind of substance that's basically not super trees, but super drywall? Is that another vein on this sort of innovation path? Yeah. So drywall is another big pain point. Actually, if you ask factory built housing, factory owners, what their main factory difficulty is, whether one of their main operational difficulties is drywall is like very, very high on the list, because it's so far been like a labor intensive, very time consuming, very sort of finicky process to get like the very smooth inside surface that basically people want. It just takes a lot of time and effort and manual labor to do. That's actually a case where there is a robot that can now set drywall, but still the whole process is still quite slow and labor intensive.

And people have been looking for a very long time for it to find a way to put an interior finish surface that doesn't take days and days and tons of comparatively high amount of labor to produce. It's just very hard to find a sort of material that has the sort of nice combination of drywall properties, which is inexpensive and produces the nice seam pre-surface that people like. And you can take a lot of different finishes, you can paint in different colors, you can put wallpaper on it, and is fire resistant and is cheap. It's very hard to find a combination of all those things. And so there's different materials that you can use for like the interior finish of a room, but they tend to sort of be lacking in one or more of those things.

And that sort of has really hindered adoption. Most people still in the US especially still use drywall for the interior. And on the part of the process that is the actual labor, the putting up of the house, not building the super trees and developing the super drywall, but actually finding a way to build houses in less time. I'm sort of reminded of the fact that we had some people talking about fusion technology as being sort of the dream of limitless clean energy.

Is there like a fusion dream but for housing construction innovation that someone's working on or maybe lots of different companies are working on that's like, this is what we ultimately want to try to make. So we talked a little bit about factory built housing in mobile homes. The big one that has come up over and over again is we should build houses in factories the same way
we build everything else. People look at the process for making a car or a computer, literally anything else. And it's just cranked off some assembly line at very high speeds and gives us like very affordable consumer products. And people look at the housing process, which is built onsite by hand, not that different from the way houses were built 100 years ago and people looks archaic and like, well, we just need to take this process that we figured out for everything else and apply it to home construction, building construction, and we will make everything much more efficient. And that's sort of been something that people have been trying over and over again for, again, decades and decades. I myself worked at a construction startup that raised several billion dollars trying to basically take that approach, build buildings and factories, we build everything else and we'll build them so much cheaper and be a low cost supplier on the market and be able to produce in huge volumes and we will become the Henry Ford of housing. It did not work for them. They spent $2 billion of investor money trying to do that unsuccessfully, and it hasn't really worked for the other people that have also tried, which is not just, of course, to say that you can't build a building in a factory. You, of course, can and many people build successful businesses doing exactly that. And especially in Europe, factory built housing is much more popular than it is in the US, Japan as well. But what you can't do is what no one has really figured out how to do is become the Henry Ford of housing where you've come up with this factory built method that is just so much more efficient and so much cheaper than currently existing methods that it just wipes out the previous way of doing things and it's unimaginable going back.

Quick question, quick follow-up. Is the problem as you see it for factory built housing in America on the supply side because there are constraints that innovation can't overcome?

Or is it also partly on the demand side that Americans, perhaps unlike Europeans, although in this question I'm literally just guessing, we have certain expectations that our houses be original, that we not live in cookie cutter mansions, that there's a kind of American desire for uniqueness that makes it a little bit harder to get the kind of efficiencies that you get from modularizing and repeating the same construction process over and over again.

I guess how much of the issues that your startup faced, how much of it was a supply problem versus what you perceived or experienced as also an American demand problem?

Sure. I will separate out the startup that I worked at from the problem more generally. I worked at had various challenges that were specific to them and operational issues and stuff like that. But to talk about the sort of fraud or problem, there's definitely like supply problems in the sense that it's hard to do that and dramatically build built housing in a factory and dramatically reduce your cost while doing so. The very high level mechanic is you don't get as many efficiencies as you think that you might because you just don't have the production volume to produce hundreds of thousands of units. And a lot of the efficiencies that you do tend to be eaten up by high transportation costs. So that's a high level look at the supply problem. The demand problem, I think, is more a function of the fact that in the U.S., especially,

it's just with our sort of federal system, we just have the fact that
building regulations are often done at a state or local or municipal level.
We just have thousands and thousands of permitting jurisdictions in the U.S., each one which might have its own requirements, each one which might want to review your specific building and see if it fits in with the other buildings around it and stuff like that. And even in the absence of that, every sort of site is a little bit different. The workforce is always a little bit different. So there's always this variability that makes it very hard to crank out a uniform or
product. I actually don't really think that it is on the consumer side. I actually think if, empirically, people seem pretty okay with living in very, very uniform houses.
If you look at actually most new housing developments, it's really just like six or seven floor plans copied over and over again. Maybe they changed the paint color. Maybe they flipped the orientation back and forth. But it really is quite repetitive. It's really pretty much the same unit over and over again. If you look like apartment buildings, it's really just a few different floor plans, again copied over and over and over again. Empirically, people don't seem to value uniqueness really that much. And also, I think if you look at other things, this is also the case. Everyone always makes this observation that if you look at cars, every single car manufacturer has basically the same or mass market car manufacturer has like the exact same model offerings. It's almost everything else. It's just even SUV, you have a four door sedan, you may have a slightly smaller compact, and everyone has a nearly identical looking version of basically the same five or six types of car. And of course, you have different trim options that you can do to customize your specific taste. And of course, that also exists in housing. You can change the paint color and sort of change the finishes in your bathroom or your kitchen and stuff like that. So I think the level of customization that people demand is not incompatible with like sort of a factory built housing system. It's just there's all these other constraints that make it quite hard. Last question. If I told you that 20 years from now, by the year 2043, this multi-decade trend of construction productivity going down, down, down had suddenly reversed itself. That actually in the golden years between 2023 and 2043, construction productivity had suddenly taken off. That's your news headlines from 2043.
Would you be more likely to believe that this was a regulatory success? That the Yimbis, the yes and my backyard movement, the abundance movement, all of these pro build, pro growth movements, thrillingly succeeded and got federal, state, and local governments to pull back regulations and made it easier to build and that unleashed construction productivity that had been pinched in the previous half century? Would you be more likely to believe that story or would you be more likely to believe the story that the fusion breakthrough in construction had finally come? We'd figured out some way to eke out extraordinary productivity gains and cost declines in the mere construction of homes, even though nothing changed the regulation side.
Which side of this problem do you think is more likely to see its breakthrough, regulation or innovation? That's a good question. I think it's going to be very hard to solve it without both, but if you're forcing me to choose, I think probably the thing that would be most likely to solve that is just if automation gets really good. I talked before how automation has this physical aspect of it and this informational processing aspect of it and we're slowly getting better at the informational processing aspect of it. If you could have a really general purpose automation, like a humanoid robot or that was basically as capable as a manual labor and wasn't

outrageously expensive or something to that equivalent, that would really change the game in construction. That would enable a lot of I think productivity improvements that we haven't really seen. It's unclear to me how close we are to something like that. Some people think we're quite close. I myself am perhaps a little bit more skeptical, but I think that would be a huge deal.
Yeah, I personally am not holding my breath for C3PO, the bricklayer. If we get it, fantastic. I don't think that particular breakthrough is imminent, but as always, the cop-out answer is probably the correct answer, which is that we probably need both.
Brian Potter, thank you so much for doing this. I really appreciate it.
Yeah, it's been great to be here. Thanks for having me.
Playing English was hosted and reported by me, Derek Thompson, and produced by Devon Manzi. We'll see you back here every Tuesday for a brand new episode. Have a great week.