LEAD WITH WE
SEASON 2: EPISODE 014
Tobias Peggs, Square Roots

Simon Mainwaring:

From We First and Goal 17 Media, welcome to Lead With We. I'm Simon Mainwaring and each week I get to speak with top business leaders and founders about the revolutionary mindsets and methods they use to build their bottom line and a better future for all of us by leading with we. Today I'm talking with Tobias Peggs, the co-founder and CEO of Square Roots. Square Roots is an indoor urban farming company that is transforming how food is grown and distributed in the US in truly exciting ways. Now, Tobias comes from the tech world, he has a PhD in machine learning and has worked with many successful startups. So I'm really excited to talk with him about the intersection of technology and the local food movement plus so much more. Tobias, welcome to Lead With We.

Tobias Peggs:

Thank you very much.

Simon Mainwaring:

Tobias, machine learning, local food, bridge that gap for me, that's like an Evel Knievel leap.

Tobias Peggs:

Yeah, it's perfect training to be a farmer, right? As it happens, there is a data science reason as to why I ended up in food. One of my previous tech companies was acquired by probably the world's largest retailer and as part of that acquisition, I was working there for a year. And one of the projects that they had me do was study global grocery buying behaviors.

Simon Mainwaring:

This was Walmart. Was it Walmart?

Tobias Peggs:

And as a data scientist what I saw there was pretty scary, honestly, right? So obviously at Walmart scale you've got 300 million customers or whatever, they've got buying their groceries every day, that's a lot of data.

Simon Mainwaring:

That's a lot of data.

Tobias Peggs:

And as I found out, that's a lot of bananas flying all over the world from one part of the planet to the other.

Simon Mainwaring:

Flying in and flying out, I can only imagine.

Tobias Peggs:

You sort of realize or you begin to think about the impact on the planet of that transport. As food is traveling, nutrients are breaking down and maybe the quality of food isn't so good at the end of long supply chains as it would be for local food. And then I began to sort of see just you talk to customers and don't really have any idea of where their food comes from, that kind of sense of community around food was just lost and so that was the spark of the idea for me.

I was thinking, well listen, people want food from all over the world, that's not going to change, but instead of shipping food from one part of the world to the other, how about we shipped environmental data from one part of the world to the other and then we could recreate climates that were perfect for growing all sorts of foods but recreate those climates in your backyard, right? In our local zip code, in the same zip code as the end consumer. And so you could grow food from all over the world, which is what people want, but get it to the retail store the same day that it's harvested. And that was kind of the original idea for Square Roots.

Simon Mainwaring:

So connect the dots because for many of us we know what AI or machine learning is, you've talked about sort of agricultural data, but how does it all fit together? How does it work? What role does that play? How did it make this idea, not just a great idea, but make it possible?

Tobias Peggs:

Sure. Yeah. So I think specifically at Square Roots it's helpful to understand the architecture of what we're building, right? So I'll give some buzzwords here, but we're basically building a network of cloud connected modular farms.

Simon Mainwaring:

Cloud connected. What does cloud connected mean?

Tobias Peggs:

Yeah. So how that sort of manifests itself is these environments that I've talked about that are good for growing food, we create those environments inside upcycled shipping containers. All right. So think about a 40 foot shipping container and that's tack day and inside that container then it's the perfect environment for growing a certain crop. We can locate that container or clusters of them as it happens in any zip code across the country or across the world, right? Now, inside those farms then we're growing the food and we've got it the perfect climate but we're also capturing data every single second as to what is happening inside that box, right? The temperature, the humidity, the nutrients at the end of a harvest cycle, what was the yield like? What was the taste? What was the texture? And that data is being captured in every single box or every container that we have across the network.

What beautifully happens then is that if in one particular box a farmer did something or we change an environmental parameter that increased the yield or reduced the resources that we need, our learning

systems will spot that information from the data and then push that new instruction out across the whole network. So it's almost like the whole network is learning how to farm better as we go about building the business.

Simon Mainwaring:

That's amazing because you're not only solving for the need but you're iterating and rapid prototyping the whole time to uplevel the whole system. I mean, I want people to really hear what you're sharing, which was, it all started by an undeniable need that you saw in terms of the inefficiencies and the logistics and the shipping of all the produce that comes in everyday. But then the ambition you had as an entrepreneur was massive to just revolutionize the way that we think about food supply and localizing it. So there was no limit on your ambition but then how did you go from that idea, I know you partner with Kimbal Musk, how did you go from that idea to execution? Because when you've got a huge idea like that sometimes it's intimidating, you go, well, great idea but I can never do that. So where did you start?

Tobias Peggs:

Yeah, it's a really interesting question because as we started to sit there and dream about what this business would be at scale, we saw that we had these modular farms in every city, in every country across the world. And that is the way that we're able to think about feeding every consumer on the planet with locally grown food. And there was a big missing piece of the puzzle as we thought about that, which is we knew there would not be enough farmers to hire to be able to staff all of those farms. And that quickly led us actually to the second really fundamental sort of pillar of purpose, if you like, around a business which is to provide pathways for young people to come into the farming industry and become the future leaders and there's a big need there, right? The average age of a farmer in the United States is 58 years old.

So as well as all of the problems with the food system that are somewhat understood now, it's a big greenhouse gas contributor, 70% of food that we eat has got trace pesticides in it, 40% of food from industrial systems is just wasted, we can go on and on and on about the problems. In addition, there is a demographic time bomb that is about to detonate across our food system which is, who the hell is going to grow all the food when our current farmers retire in five or 10 years time, right?

Simon Mainwaring:

Never thought of that. You're right.

Tobias Peggs:

So we knew that we had to go figure out a way to bring young people into the industry and train them quickly so that they could be not just productive farmers but feel very infused about a career in a completely new industry for them. So the first thing that we did as a business was prove to ourselves that we could train young people to be farmers. And we put a platform together, hardware and software that enabled us to do that. And 12 months after starting the company, we had trained 10 young people, many of whom had never even grown an eggplant before and they were capable of growing this really, really, really tasty food.

Simon Mainwaring:

They must have been thrilled, what was their reaction?

Tobias Peggs:

It was wild. I mean, we had a guy who was an investment banker who was bored sitting behind a spreadsheet all day long and quit his job to join Square Roots because he wanted to make an impact on the world, who was growing the most delicious kale that you've ever tasted in your life sort of six months after making that transition. It was just magic to see that happen.

Simon Mainwaring:

It's powerful stuff, I mean, it's really powerful. And I get a sense that you've got these modular farms but it's almost like a network of distribution of locally grown produce. Where's the hub? Do you have centers around the country that then look after these various sort of modular farms? How does the structure work?

Tobias Peggs:

Yeah, sure. It's actually a fully distributed model, right? So when we think about deploying a farm in a new city obviously we want to make sure there's demand in that city, is it big enough to frankly buy the food that we're growing. And what we like to do is deploy clusters of these modular farms together so that there's some kind of operational scale and the business economics work, but then that farm serving that market runs its own kind of independent business entity sat on top of a standard technology platform. And so again, go back to the sort of customer proposition in away from the sort of buzz words that I'm using.

If you are a customer in Grand Rapids, Michigan, and you come across Square Roots and Square Roots is your local farm, you can drive to the farm, you can meet the farmers, the food that you buy on a supermarket shelf was grown in your zip code and was harvested 24 hours ago. If you are a Square Roots customer in New York City, same thing, New York City is your local farm, you can jump on the subway, go to the farm, meet the farmers, the whole thing. It's a very consistent experience, right? Because those consumer experiences are set on top of this very, very scalable platform of technology and data and process and the whole thing but the consumer experience is a hyper-local one.

Simon Mainwaring:

That's fantastic. I mean, because the credibility of the brand but also the integrity of your product turns on that, their ability to sort of see the new version of what farming looks like. Let me ask you, when you actually kind of took this to scale, when you were taking it to market, there must've been obstacles in the way from a technology point of view or even from an agricultural point of view, like isn't there a certain constitution of soil that certain types of crops or plants require or certain climactic conditions that are very hard to recreate in a small space, like a container. How did you think through these microcosms you're building?

Tobias Peggs:

Yeah, it is interesting. Honestly, the first challenge though was just to convince people that we weren't insane, right? You can imagine the pitch-

Simon Mainwaring:

I love that. Like the first job, we are not insane, mission accomplished. Thank you very much, there we go.

Tobias Peggs:

... You can imagine the pitch, all right, we're going to take these young people who've never grown any food before and put them in a metal box in a parking lot in Brooklyn and they're going to grow the most amazing food you've ever tasted in your life, people thought we were nuts. So once we've proven that then we got on with other challenges. But in terms of some of the things that you talk about, answering it from the specific question about what types of things can we grow in the farm and it's not really a question of capability. In the sort of three years we've been up and running with our farming system, we've grown probably 400 different varieties of crops like herbs, leafy greens, fruiting crops like strawberries, tomatoes, I mean, we've grown turnips and eggplants and all sorts of stuff.

But the question is really economics, right? What can you grow and get to market at a competitive price? And to put it in its simplest terms, the heavier the vegetable you're trying to grow, the more energy is required to grow that vegetable and so the more expensive it becomes, right? Photosynthesis, that plant growing is basically the plant taking energy from a light source and converting that into biomass, right? Our light sources are artificial lights, it's LEDs. We do that so we have perfect year round control and there's the exact amount of energy going into the plant.

But of course that costs money, right? So I can grow turnips today but there's so much biomass there that it's going to take so much energy and make sense, whereas things like herbs and leafy greens and the small fruiting crops, tomatoes, strawberries, that's all very possible with the system today. But then this is where the sort of data science and the technology sort of marries, right? Which is if I'm an outdoor farmer, I can't suddenly look at the sun and make it twice as efficient and reduce my cost or double my yield, whereas as an indoor farmer, I can do that. So the way I sort of think about it is walk into a supermarket, your favorite supermarket, line up every single fruit and vegetable from the lightest to heaviest and that's essentially our product roadmap for the next 20 years.

Simon Mainwaring:

With the diminishing amount of arable land in the world and unsustainable agricultural practices, it might sound like a science fiction leap what you're doing, but it's absolutely critical. And how intentional were you about your purpose in the first place? What is the purpose of Square Roots and how do you articulate that? And did you start with that and then build a business model out of it? Or did you reverse engineer out of just this solution to the need?

Tobias Peggs:

We started with it actually. I mentioned, after sort of me and Kimbal came up with the idea and we got the initial funding, there were two of us in a WeWork office kind of getting the thing up and running. And literally the first thing we did was put together a mission statement and a set of core values.

Simon Mainwaring:

Awesome.

Tobias Peggs:

And what we sort of said was, listen, if we're going to sign up to work for this company for the next 20 years, let's make it a company we want to get out of bed for every single day, let's really believe in the mission and the purpose. And then let's create a culture codified by this set of values that we really enjoy being in, right? So if we've got that done, okay, now this is the mission of the company and this is how it's going to feel as we're sort of approaching that mission over the next decade so right now go build a company that is doing that and feels like that on a daily basis.

Simon Mainwaring:

Now you need to build that brand because you need a great product and a great story, so what is the mission of the company? What are those values?

Tobias Peggs:

So the mission of the company as it's articulated is to bring locally grown food to people in cities all across the world and do that while empowering the next generation of leaders in urban agriculture.

Simon Mainwaring:

Right. And the values that define the culture and how you want to show up in the world.

Tobias Peggs:

Yeah. So there's a set of about 12 or 14. We have values and demos and I'm just kind of, we don't have to go through all of those now, but you're right. They basically codify how we show up for each other, how we show up for our customers, how we show up for ourselves, essentially.

Simon Mainwaring:

Did you get any pushback from the whole idea of, you're still answering the same need as traditional farmers but in some way, it's kind of like Uber coming into the taxi business, there's a whole other way of doing things. And does that sort of cannibalize those that work on the land or the generational families that have been there? Was there any sensitivity around that?

Tobias Peggs:

Yeah, it's a good question. I'm certainly not going to sit here and say that a 100% of the food that we eat in the future is all going to be grown in indoor farms. I don't believe that's a right thing to do, I don't believe that will happen. In parallel we work very closely with soil-based farmers who have got millennia of experience growing this food and we're growing the same food, right? It might be indoors and we're creating the environment but they're growing basil, we're growing basil, they're growing kale, we're growing kale. There's a lot that we can learn there and should do, right? And we're very open to taking advice and listening.

I'll give you an example, a good technique in organic farming is known as integrated pest management. Where a farmer might release beneficial insects onto the crop essentially ridding the nasty insects that we don't want, right? We use exactly that technique inside the farm. So we'll release beneficial insects as part of an IPM program, which is almost a one for one parallel with what an organic farmer is doing. It would be ridiculous if we didn't sit down and talk with organic farmers about how they do that and their

best practices, right? So I think that's a good example. What I would say is that the farmers that we work with are very much on the same sort of mission, which is how do we get people more connected with where their food comes from? How do we build that sense of community around food? And I think the sort of common enemy, if you like, is the industrial food system, that shipping in food from thousands of miles away where people have no idea where it's come from and it's not particularly good for the planet or for the people.

Simon Mainwaring:

And I mean, the commodities markets themselves, you hear that the prices go up, they go down, they're affected by natural disasters, there's waste and food is dumped each year. Does this help provide a better control system for the amount of food that's produced?

Tobias Peggs:

Oh my gosh. Yeah. I mean, if you are a field farmer you need to over plant to hedge against nature. You can have a biblical hail storm drop on our farm and does it make any difference, right? Because we're all indoors, right? Whereas if that happens outdoors you've lost all of your crop, right? So in the industrial food system, farmers are over planting, food is traveling for weeks on end and trucks are being bounced around, a lot of that is getting destroyed and it gets to the supermarket and the supermarket will reject it if it doesn't look pretty enough because they don't think they can sell it, right? And then consumers, especially in America will over-consume and there's food waste at the end of the week. So in all, if you look at the American industrial food system, 40% of the food that we grow is wasted along that supply chain.

Simon Mainwaring:

It's unbelievable, right?

Tobias Peggs:

With Square Roots because we're indoor, there's a lot of precision, a lot of control, we can grow food for demand. We don't need to over plant, right? For every seed that goes in I know exactly how much food is coming at the end of the day. Because the supermarkets that we work with, in many cases are within two or five miles at the farm, the food is getting there the next day, there's no food waste on the way. And then the shelf life of the product, because it's only taken a day to get to the farmer is extraordinary so there's very little waste. The estimates that we've done on our system, we think we have a 3% waste across our chain versus a 40% waste in the industrial food system.

Simon Mainwaring:

If you're responding to a need as big as this then so are others. And when we hear things about vertical farming, you see genetic modifications that increase crop yield out of the same amount of soil or land. What does competition look like as you sort of step into this huge opportunity?

Tobias Peggs:

Yeah. I mean, for sure, vertical farming, controlled climate agriculture, high-tech farming, the world that we're in is definitely a sort of hot industry right now. Every week there's a new announcement of some new farm or some new mega funding rain that's happening, it's very exciting but it's still very early, right? Food is a $12 trillion industry and there's like 20 companies that have raised a bunch of money that are

doing this stuff in America, right? Where we're a tiny part of that absolutely ginormous market right now. We're also very collaborative actually, I know pretty much every founder or CEO of every indoor farming company that's there and there's remarkable alignment around that mission.

Everybody understands that we've got to change the food system and if we're helping each other out, it's better for all of us. I think the other thing that's going on with indoor farming, it actually reminds me of the internet in the early '90s, right? It's like we know this thing is inevitable but no one can quite yet tell you what shape it's going to take in the future, right? And indoor farming is kind of like that, right? There's a bunch of us that are crazy enough to jump in because it is inevitable and we're all kind of helping each other figure out how this eventually feeds every consumer in the world.

Simon Mainwaring:

And how do you address misperception by consumers that this is Frankenfood, its wild science, how do you show with transparency that this has not only the same taste experience, which is half the better one, but the same quality and integrity as what they get from a local farm?

Tobias Peggs:

Yeah. Transparency is obviously key, right? If you ask any consumer what they want from the food system, it's more transparency. Where did my food come from? Do I trust that this is food I want to be feeding my kids tonight? That's the number one question and the current industrial system is so opaque, it's kind of hard to see that. So we kind of baked this idea of transparency right into, not just core values but into the physical product. So on the hardware side, the farms themselves, we have massive windows at the end of the farms, right? So if you're walking by in the neighborhoods you can just have a look in and see-

Simon Mainwaring:

It's like the room where all the babies are in the hospital, you can go in and say which one is ours.

Tobias Peggs:

Exactly right. Yeah. Oh, that's my basil, I will buy that tomorrow.

Simon Mainwaring:

That's my basil.

Tobias Peggs:

And then because the whole thing is kind of connected and we're tracking data every step of the way and again, how can that benefit the consumer on every package of Square Roots product? There's a QR code that you can scan, which will pop open a mobile webpage on your phone that will show you the complete story of where your food came from, from seed to shelf. And it will show you pictures along the way, the picture of the farmer who harvested it yesterday and you can click on that and learn more about that farmer. So even if you can't physically get to the farm, we're still providing that complete sort of transparency and also of course, traceability of the product to the consumer at the supermarket shelf.

Simon Mainwaring:

I mean, that's so powerful because consumers aren't just conscious today, they can be equally punitive. They're like, if you're not doing the right thing and if you're not defensible, then we're going to call you out. And that's interesting because there's alternatives out there like Sourcemap that would allow you to see the supply chain of a product, which would give you some sense of confidence that it came from the right place and there was an unnecessary carbon footprint and so on, but you're taking that all out of the equation. You're localizing the production outright so you don't even need to worry about all of that. When you go to build the business now as an entrepreneur, much like we saw with sort of Elon Musk and Tesla, is the mission itself so compelling people come to you or do you need to go out and find people to work with you and sort of sell them in on the vision and help them understand the technology?

Tobias Peggs:

Yeah, it's a good question. I don't think there's a one size fits all. And so what I will say is that we use that mission and our values to ensure that there's alignment with a partner or with a new hire as we think about scaling the business, we obviously want to scale the culture as well and make sure that we're building a fantastic organization at scale that is doing the right thing, quote unquote, as part of its DNA. And so we're very very deliberate as a set on things like hiring or thinking about partners that we work with to really do our due diligence and make sure there's mission and values alignment.

If that's not there on day one you're going to quickly get off track and things are going to just feel harder. When a new hire or a new partner that you're working with is like you, trying to fix the food system and trying to bring this idea of real local food to people, there are going to be bumps in the road, there are going to be things that don't go quite right. But if there's that shared sort of purpose and a shared articulation of what the mission is, then you bash through those things and you make that happen. It's a very powerful multiplier.

Simon Mainwaring:

When you think back to that initial moment of insight where you thought what's wrong with this picture, when you were doing all of that logistic work before and you saw the waste and so on, if you build on that, like what does the future of food look like in your mind Tobias? What can we imagine 10 years down the track? What do you think it would look like?

Tobias Peggs:

Yeah. I mean, one, I think the food system has to become a lot more responsible, sustainable, whatever words you put on that. The current food system cannot feed the near future world which has 10 billion people, 70% living in urban areas sort of not near these industrial farms. Like the problems that we have today with transport and all those things only get worse in the very immediate future and there's an obligation to fix that. But I also think the consumer is not going to stand for that food system any longer, right? And you see this in organic food in the US which is kind of a label for what people think is uh better for your system. Then there are some issues with it but let's put those aside for now. Organic food has gone from essentially zero when I came to the US 50 years ago to 25, $30 billion industry right now and that's all driven by the consumer saying there has to be a better way, right?

So I think that mega trend is happening, I also think it's been accelerated by COVID, right? Because overnight people were forced to stay at home and cook. And so you get more curious about the food that you're buying and you observe how long it lasts in your refrigerator and you find out why and you get a bit more educated about where your food is coming from, so all these things are helping. And then of course, technology advances making the lighting systems more efficient, which is essentially meaning we're able to bring down our cost or grow a wider array of products, all of those things are combining. So we are as the Americans would say, right at the early beginning of indoor farming here, we're just getting started.

Simon Mainwaring:

And I love the breadth of your ambition in terms of triangulating a growing population, the climate crisis, and taking on the yields of the industrial food system as it stands. I mean, it's a real powerful example of just how big an ambition can be, which also I have enormous respect for how crazy you are for taking it on in the first place and executing against it because we just need that sort of bravery right now. We need that courage to step into these great needs and to enable these industries and to create these companies and to sort of support it, support the peers, because that's the only way we're going to meet these challenges with greater speed and equal force. So Tobias, really appreciate sharing the insights, much respect for what Square Roots is doing. And where should we go to find out more, what's your website?

Tobias Peggs:

Sure. Yeah. We're very active on social. You can follow us on Instagram or Twitter or wherever else on @squarerootsgrow. And then our website is squarerootsgrow.com. One of the things we list on our website is dates for future farm tours. Now we have not had too many farm tours in the last 12 months, but very hopeful-

Simon Mainwaring:

So book your farm for now.

Tobias Peggs:

... I would be very, very, very happy for everyone to sign up to the first farm tour. Not only do I want to see, but that means the world is a much, much better place than it has been this year. So.

Simon Mainwaring:

I agree. Think of it, it's the perfect first date.

Tobias Peggs:

There you go.

Simon Mainwaring:

I'm taking you to a farm tour. Thanks so much for your time Tobias, really appreciate it.

Tobias Peggs:

Thank you very much.

Simon Mainwaring:

Thanks for joining us for another episode of Lead With We, where I spoke with Tobias Peggs, the co-founder and CEO of Square Roots, who shared with us how to transform a huge marketplace need into an effectively limitless business opportunity. Our show is produced by Goal 17 Media and you can find more information about Tobias and Square Roots in the show notes for this episode. Make sure you subscribe to Lead With We on Apple, Google, or Spotify, and do share it with your friends and colleagues so they too can build purposeful and profitable businesses. You can also watch our episode on YouTube at WeFirstTV. And if you'd like to learn more about purposeful branding, check out wefirstbranding.com where we have lots of free resources and case studies. I'll see you on the next episode and until then let's all lead with we.