Richard Miles: 0:01

Inventors and their inventions. Welcome to Radio Cade -- a podcast from the Cade Museum for Creativity and Invention in Gainesville, Florida. Starting in running your own company -- it's not for everyone. For those who have done it, it can be exhilarating, exhausting, and easily the hardest thing they've ever done. We decided to go out and talk to some of those people and find out what they've learned, what they'd repeat, what they'll never do again, or hear stories from their first year, then from the period when they realized they're going to survive and how they intend to position their companies for the future. We'll find out what a CEO's normal day is like, how they build and manage their teams, what it's done to their personal lives. And finally, when is it time to move on? Join us for CEO101 -- a limited series of deep looks at people who are their own boss -- for better or for worse.

James Di Virgilio: 0:54

We're talking with Craig Bandes, the president and CEO of Pixelligent Technologies. It's a nanotechnology company that does a whole lot of fascinating things that Craig is going to tell us all about. But first, Craig, tell us about your background as a leader. You've done a lot of things -- both co-founding companies, as well as being brought in to be a CEO.

Craig Bandes: 1:14

Yeah. Well, great. Thanks for inviting me to join today. So, you know , I think it's , it's nothing that I think you can prepare for without being in the role. There's so much of it that you figure out as you go. There's definitely taking advantage of books on leadership or being mentored by others that have come before you, but there's nothing like being in it to really make all the mistakes, hopefully learn from them, and start to formulate what you think is a, a good compilation of strategies, right? There's not just one that I think makes a leader, or a CEO, successful.

James Di Virgilio: 1:45

Give us a little bit about your, just, biography, sort of the companies that you've led. Give us a CV here.

Craig Bandes: 1:51

So, very different companies, very different industries. The first company I co-founded with a partner was in IT staffing and consulting -- and that was an area where he had slightly more experience than I did in it. And we were big users of those, sort of resources and vendors when we're both working together as executives in a telecom company, which [inaudible] many back around the uh, circa 2000, didn't work out after raising lots and lots of money -- which was my main job when I was there. And so we started it together, and it was not my lifelong dream to do it, but I had more entrepreneurial background than he did, so it was more, helping get started. I did that for a couple of years, and I'm still running more of a lifestyle type of business today, and decided that really was not what I was looking for, so [I] moved on from that and got recruited to go join a -- very early stages -- a company that was being formed in the Homeland Security sector, not too long after 9/11. So this would have been in, like, early 2003 when the Department of Homeland Security was just really coming together; and there was a huge need for companies that could come in and provide services to this [inaudible] organization to try and find all kinds of ways to make sure we were better prepared for all kinds of things and acts of terrorism, for sure, but just generally, even natural disasters. It's not something that was well-integrated in state and local and federal governments. And so I was brought in [inaudible] Global Secure as the president. I wound up taking over the CEO title about a year later and grew that company to, from really three of us, to about 300 people with operations in five states that span software development and training services, and many batches of protective gear and raised about $25 million, maybe closer to $30 million, had nationwide distribution channels we set up... And then ultimately, after trying to go public, but not hitting the window at the right time, when I'm selling off the business at the end of 2007, into early 2008. And that's about the time that I was approached by a friend, who's a corporate attorney in D.C., to try and take a look at this company called Pixeligent, which was a very early-stage, non-material company at the time, but also happened to find themselves in a bad spot of bankruptcy and litigation against a large public company. So I was really brought in to see if it was salvageable, and brought in some experts that knew IP portfolios much better than I did, said there was good IP here, and decided to get involved and see if I could at least get it turned upright, and then see what happened. Appointed by the bankruptcy court, the chief restructuring officer wound up restructuring the company, ending the litigation, getting back control of the IP. And then we had to raise money for a pre-revenue, recently bankrupt, [inaudible] technology company in January of 2009 -- which could not have been worse timing. So we got out by the skin of our teeth, for myself and a bunch of local investors that I know and started the process of rebuilding Pixelligent.

James Di Virgilio: 4:38

That's a fascinating story that we could spend an entire podcast on, for sure. I also started my wealth management firm in February of 2009. So I know, I know exactly what kind of time that was. All right, Greg, take us back to what you would consider to be your early formative years as either a CEO or a co-founder. What was it like for you to take on that kind of role?

Craig Bandes: 5:02

So, we went in with -- on the first one, at least -- called Focus Technology, we went in saying, "hey, we're going to start this company." The telecom company had ended. And there were a bunch of really good people that we thought we could bring on quickly. First time I wrote a big check to get something started as did my partner. And it was just dark right, and very entrepreneurial, not a lot of great planning. It was just, "we think there's a good opportunity and let's, let's go." And the first big lessons for me there were, one: we hired a lot of people too quickly. And all of a sudden we had a burn that put a lot of pressure on us to go close business in a way that was really not organic. We figured it out, but it wasn't without a lot more pressure [inaudible] that we really needed to put ourselves under, and we should have started much more cautiously with a handful of people, including ourselves, and built it a little more brick by brick. I think the timing was, around when we started the business, was when things were contracting in the world of telecos. And we thought that meant it would be a good opportunity to go after short-term staffing, as these companies were cutting fixed overhead and we realized that that was not the right premise, that the consultants were the first to go. And so there , there is a lot of things that we jumped out of the gate on, and I put a lot more faith than my partner, who felt he knew that business better than I did. And within about six months, we were digging ourselves out, as opposed to growing the company. That first lesson, or basket of lessons, was: when you're starting, start more carefully -- really understand the markets better, the timing of what's happening in those markets better. Figure out what is the right number of employees you need to really just get things started -- and even if it means you're going to lose some really terrific talent that you may not be able to get back, it's a safer, better bet to do that and then go find other team members as you grow. Those were the main lessons on that. And we learned them righting the ship. We wound up, you know, growing a lot more carefully after that, but those were some early missteps that, in hindsight, seem obvious, but at the time we were just excited to take off.

James Di Virgilio: 6:58

Yeah. Why take on a project like this? You come out of school, you're starting to do whatever it is you want to do. Why take on an entrepreneurial project in the first place?

Craig Bandes: 7:07

I wouldn't advise it, actually. In fact , if I look at some of the issues that led to pretty serious circumstances that Pixelligent found themselves in, it was started by three PhDs that just got through their postdoctorates and started this company without ever having worked in a business, and then really understanding what all the facets are. And sometimes for folks that are sort of, deep buried in the technology, they think the technology is the hard part in business and growing is the easy part, which obviously is not the case. There's tens of billions of pieces of paper, of patents, out there that will never see the light of day. Most of the time -- and there are the Mark

Zuckerbergs and the Bill Gateses of the world -- for every one of those there's millions more that maybe try too early. And so I would say the first thing is, that it's better to go out and just get some level of experience before you start. I think once you have that, and you have an idea of that you think is a service or a product that's missing in , in whatever market that you're in, or you're aware of. And you get to a point where you just realize that, "if I don't try it, I'll never know, and I'll always regret it." And then you jump into it . But jumping in with more experience, I think, really increases the odds of surviving .

James Di Virgilio: 8:14

This is a lot of good information. Let's probe this a little bit further. You talked about funding early on, and obviously that's the lifeline of any company that's trying to go anywhere. You have to fund your ideas, be able to get your product or service to market. It's much different obtaining funding in your current role at your current stage, I'm sure than it was in the beginning, in the early stages. What was it like for you to take on a project and then have to go out and get funding in the early stages, given that you had probably never generated funding for something before?

Craig Bandes: 8:42

So my background was a little different. I came out of investment banking and venture cap. And so, so I was very comfortable with the capital markets. Back -- growing up, my family had an over-the-counter trading firm when I got my [inaudible] seven right after high school. So I was deeply enmeshed in the financial markets and was very comfortable in the language, and the way things worked . So, for me, jumping into raising capital was something that was a skill set that I just already had, so I think on that front, I definitely had an advantage. I did a lot of capital raising at the telecom company where it was $275 million of equity and debt capital for that company, and then filed to go public with that company as well, and ran that process. So I had a lot of really good background . So when I jumped into, even with Focus -- the first company -- we raised a little bit of money, like a million and a half or $2 million, maybe. Beyond that we put into it ourselves, it wasn't that difficult. I think as you start to go into companies that have a much bigger appetite for cash, like this one -- Pixelligent -- today, we raised over $50 million of equity so far, and we're not done yet. But what I learned along the way here is that there's many different types of capital. And I think a lot of entrepreneurs get focused on venture, and very few of them get it. And so you can spend a lot of time , especially at the early stage of launching, trying to go chase that capital with a very low likelihood of success. And so I think about it of: there's many pockets of capital , right? There's the initial friends and family round, then there's the angel round, then there's a super angel round, family offices. And then there's different flavors of different stages of venture capitalists. There's corporate venturing -- and that helps bring in some strategic capital that may help you scale your business faster, open up markets faster than you could on your own. And so when I tell friends, or , or when I mentor for classes, that you really want to understand, what type of capital do you need, how much do you really need to get to the next one or two milestones to start to show real progress? And you can point to success that will help you go raise additional and greater sums of capital and really know the audience who you're talking to well -- in terms of the type of investor you're talking to because each one of those that I mentioned will have a very different set of criteria they're looking at and a different set of objectives that they're looking for. And so sometimes I see, especially first-time money-raisers , kind of put together a deck and think it's a one size-fits-all. And it's not. I have probably put together, even with Pixelligent, hundreds of different decks, targeting different types of investors, depending on really understanding what their objectives were and why they would want to write a check.

James Di Virgilio: 11:13

Yeah, that's really good information, especially on the funding side, which you mentioned a little bit already about. Especially if they're inventors on the technology side or the ones that created the innovation, the business side tends to be foreign to them -- and the funding side tends to be very, very foreign. What were some challenges that you faced or found particularly difficult during the early stages of your career? Again, as a CEO and co-founder.

Craig Bandes: 11:37

I think some of the challenges or the key lessons learned, well we covered a little bit of this already, which is: start more slowly and build into it so that you don't put too much pressure on capital raised and just control the burn until you really start to get real revenue traction with your customers. I think the understanding of all kinds of different stakeholders that can help you be successful, right ? So we talked just now about raising capital -- that's one area you need to know -- but I had great success in bringing on awesome advisory board members along the way who bring skill sets from a technical perspective, a financial perspective, maybe more of a strategic or a market entrepreneurial perspective. And having them on the team not only makes the team overall smarter, we can leverage their experience. We can leverage their networks in terms of capital raising, customers, or just an understanding of how markets work. And I think the other key piece of it is: when you're out there building the company, you've really got to focus on bringing on the right employees, right? And every time I settled for anybody, you're bringing on the wrong body. You have to, even though you might be under a great deal of pressure, you know you need more people, you really have to focus and t ake the time to bring on the right people. And the right people will be the ones that you have to sell. It's just not a matter of you're going to give them a job and pay them a salary a nd g etting t hem m ix equity. B ut people that I brought on that have been the best, h ave really been the ones that have put me through the pieces the most a nd t urned o ut to be the most productive and most loyal employees. And so, really understanding as t he CEO, it's your job to basically convince and sell all your stakeholders. I t's not just t hat in this case, a, uh, an investor stakeholder, but really everybody that you need to be on the team to help you be successful.

James Di Virgilio: 13:21

So true when it comes to people being what moves these things forward, right? The wrong team and the best ideas -- not going to get it done. You have to have both of those things. Let's move from, let's call it, your rookie years, your early years to your middle years. You're a veteran now. You're established, you've done some things already. You've learned some of these lessons, which you've already shared, thus far. How did that change how you were able to lead as a CEO, having some of that experience under your belt already?

Craig Bandes: 13:46

So I think part of it is you , you learn to be a little more thoughtful before you make decisions, in terms of people over investment. Once you've gone through some of those painful processes in the past that you were maybe moving too quickly, I think you start to realize how important the CEO is in setting the tone for the organization and understanding really the impact you have on the organization. Sometimes we're so focused on the objective of just getting it done and charging hard to go after, especially after you raise some capital and you've got investors over your shoulder. It's really important that you make sure that the team really understands where you're headed, and why that's hard, in an entrepreneurial venture, is that that changes, right? The classic word, pivot -- there's many pivots. I can't count them [inaudible] here. And when you do that, it's really important to make sure everyone understands what the new objectives and goals are and to spend the time with everybody. And I think some of the mistakes I've made was: I thought it was clear after one meeting and "we got to go do this." And it wasn't. And sometimes that would make people frustrated. Sometimes it would make them feel alienated . Sometimes they would leave, because they didn't understand the direction . And so really making sure that as we're moving forward, everyone that's in the huddle really has a good understanding of where we're going, why we're going there, what the play is that we've called. And so when we go execute, we don't have a problem . And I think that's something that I did not really take into account or grasp as much as I needed to early on. And now I spend a lot more time communicating with the team, making sure we all understand where we're moving forward. I think you can't over-communicate -- you can have too many meetings -- but you can't over-communicate to make sure everybody understands really where we're at.

James Di Virgilio: 15:21

That's a great one. Oftentimes as a leader, you can have a lot of thoughts in your head and you live with those thoughts every single day. And you spit out a few sentences, a paragraph, some moments at a meeting where you think the direction is clearly understood, but other people are not necessarily living in your head all day, knowing all the thoughts you have, and it comes out to them as some passing thoughts. So that's a great key takeaway there. During the veteran's stage, if you will, the middle stage of your, your CEO life, how did you handle growing and expanding rapidly, really starting with X number of people and then very quickly you find yourself with growing resources, growing staff -- how are you able to navigate that successfully?

Craig Bandes: 15:56

I think it's been different with different companies that I've been a part of. With Global Secure, we were a buy-and-build strategy, so we acquired three companies and another one, but it was more like a foreclosure and we got the product line and some people. So that one, we were able to scale very quickly because we had the cash and we were able to make some good acquisitions. And then that was more around an integration of the company. Now, each of these companies that we acquired were meant to be in separate areas and talked about. So it was software, it was training, it was product manufacturing. So it wasn't meant to make them work together, but still finding a way to keep, thematically, why we did what we did, and scaling that. So it was more, each one of those was very much like scaling three individual companies, which had its own set of challenges, but I also had very competent executives running those divisions. And so we were able to, as a team, move that one along pretty quickly and scale pretty quickly based off of the infrastructure that was already there when we acquired this company, but Pixelligent's different -- Pixelligent was seven PhDs, and then me, and this is a chemical manufacturing company -- it's around novel technology and nanotech , and I had never taken chemistry. I'd taken some physics. So it really was an amazingly steep learning curve for me across everything that we did. And so for this one, it was more really getting my head around, "okay, what are we doing?" And what the initial path was didn't work. So what capabilities do we have? And I think we can go sell to the market that differentiates us, and really kind of start here one step at a time and build it brick by brick, as we start to get some level of customer interest in them, and then start to build up a brand, initially here. And then we started going to Asia very early to build up our reputation there because that's a big market for us -- still spent a lot of time there, you know, non-COVID time. So it was a much more methodical approach of how we build and scale a team. But even here, we scaled very quickly. Around 2015 or 2017, we got our first big market --it was going to be in the area of solid-state lighting and LEDs. And ultimately, we missed the timing on that and we had to scale back and cut the company [inaudible] very quickly just to kind of give ourselves time to pivot, and now we've been in a rebuilding mode again, really since 2019. But in this situation, I was able to read much more quickly what was happening, make the change -- as painful as it was -- very fast, early on to give us time to recover and redirect ourselves. And had I not had the prior experiences, I think it would have made the decision [inaudible] .

James Di Virgilio: 18:20

So the prior experience obviously helps you as a leader to make better decisions. You have an algorithm in your mind that says, "I've tried that, that's not going to work in this situation. That's going to more efficiently get you to the right answer." How does your own personal brand help you? Obviously, if you're in the middle stage, you're a veteran, right? You basically have a resume that people can look at where it says, "hey, Craig has been successful doing this and that." And at the table, that gives you a little bit more credibility, right? When you're having these discussions during those years, what you say has a little more weight than if you're in the beginning where you're , you're sort of fighting tooth-and-nail, just to get some respect.

Craig Bandes: 18:54

I think that's right. But beyond the credibility that may be on a piece of paper, your experience just comes out, right? In conversations with potential employees, with investors, with board members, you're trying to recruit budget board members, customers, you just have more confidence because you've just been through so many battles; you've made, and hopefully learned from, a number of big and small mistakes along the way. And like anything else, you just feel better prepared. Whether you're looking to recruit a junior marketing person who has 10 offers and you really want her and her business, or you're in front of the CEO of a multi-billion dollar company, trying to convince them to write a check to invest in you. You just have the confidence to be able to have those conversations. You prepare for them obviously, but then there's just a certain level of understanding and background, and reading a room or a person that you just get with experience, right? So I think for me, that's the biggest part of it is just having lived through so much of it. I'm sure, you know, having a good background and people see you and check you out on LinkedIn -- that all helps, like, establish your credibility maybe before you get in the room. But I think we've all met people who are a lot better on paper than they are in person. And so being able to, when you're in that situation, in person, with whoever it is you're trying to talk to, having that experience and confidence and being able to understand what their objectives are, what yours are, and trying to find the right way to get to the result you want is really just experience.

James Di Virgilio: 20:13

And you've touched on this now, at least you've touched on the now throughout this conversation, which has been great. Let's bring you into the now in this moment right now -- here we are in 2021 -- you are the Pixelligent CEO; you have this wealth of experience behind you. The first question I want to ask is: in your opinion, is being a CEO today -- is it different than it was 15 or 20 years ago? Is it harder? Is it easier?

Craig Bandes: 20:36

I don't think it's ever easy -- it's different, right? I think it's a much more global environment. I mean, even for the size we are today -- which is not big -- in terms of employees, I have a team, small team in Korea and Taiwan. Prior to COVID, I would be in Asia once a quarter, visiting three or four countries, talking to customers and partners; we have distributors in Japan and China and Korea, Taiwan. You got to keep on top of those guys. So I just think everything is more spread out. Everything is global. And you have to think about your business and today probably on a much more global way than you ever have, and it's not going to go backwards. I think having the mindset that what you make is important, but also how you make it, and the people you have onboard your team that are responsible for delivering it is really important. So I think diversity should have always been important. I think now it has obviously a lot more of a spotlight on it. We worked and had a very diverse workforce across everything and everyone that's here. And I say everything. I mean, everything that we do, we have manufacturing, we have our research and development, we have formulation technology, I mean finance, and we have diversity really throughout the organization. And I think that adds to it. And I think there's thankfully been a lot more focus on that, but you know , I'm reading more and more articles of how that is really in this ESG movement, more and more how CEOs are being judged. And I think that's right. I think having a more sustainability and environmentally conscious mindset is critical. What we do as a materials company -- it's super important. What we make makes everything we go into a lot more efficient. So we're directly in line with that. But we also think a lot about how are we making it? And what kind of footprint are we leaving? So I think from that perspective, it's a lot more today about, broadly, what are you delivering and how are you delivering it ? Can it be more efficient, maybe less impactful? I think that's different than what you probably had 15, 20 years ago, which creates opportunities, but for sure, a lot more moving pieces.

James Di Virgilio: 22:25

So how do you handle the pressure of the media, public opinion, these goals, these directives, the globalization of being a CEO, how is all of that handled?

Craig Bandes: 22:34

I think it's different for every leader in how they internalize that process and use it. For me, it's really about -- doesn't matter the size of the organization -- we all have an impact on making sure that we create environments that are creating good opportunities for our employees to grow and to learn and to contribute. I think when you read some of these stories out there of CEOs who've gone astray that have made some pretty poor choices. You read some of these crazy pay packages that CEOs of large companies are getting paid, even when they don't do a great job, and they have these massive payouts. I think it's harder when you're talking to other media folks sometimes and saying, "not all CEOs go about their business the same way." And so I do think there is a little bit of extra thought you have to put into, to make sure that you are understood by your stakeholders and the media in a way that you want to be portrayed, which is being a thoughtful leader, that you understand the responsibilities we have as leaders; it's not only about making a lot of money for your shareholders or for your top people at the company, but it really is trying to make sure you share that as much as you can along the way. And you have equal balance on your overall responsibility along the way. So I think some of what's happened has been an important wake-up call. I think it's good. I think holding the senior executive leadership of companies, large and small, more accountable is really important. And again, I think it's a difference from what you saw 15 or 20 years ago, but I think it's a good difference.

James Di Virgilio: 24:04

Craig, I can tell through all of your answers that you're someone who's constantly trying to improve, and you're taking lessons from the past and you're applying them to today. So with that lens, what are you thinking about and focusing on now, as it pertains to you improving as a leader?

Craig Bandes: 24:20

A lot of my focus now is on how do we, as still a relatively small company, have ultimately the impact that we believe we can have, and then how do we attract more like-minded people like us to our mission here to continue to grow the company? I'm spending a lot more time -- we touched on this a little while ago -- I'm really just thinking about: where are the critical roles we need to bring on? What do those people look like; if they have a similar mindset; and to make sure we maintain that, as things continue to progress for us... Because as you grow and, we are about to hit another, I believe, pretty serious rapid growth spurt in the next 12 to 24 months, how do you not lose hold of that? In terms of really focusing on these critical issues of impact, footprint, bringing on the right people along the way, making sure we continue to maintain the diverse workforce that we have, and just making sure that we continue to really live up to the credo that we have and the ideals that we have as we grow the company through this next level here. I think that's probably the thing I focus the most on right now. We have the ability now with what we've accomplished to go, you know, access different sources of capital. We know our products that we have are impactful and the customers are telling us that. And we're, we're actually in a great position where we, in some ways, almost have more business than we can keep up with right now. So now it's a matter of: how do we continue to keep the right focus here as we grow the company along the lines that we just mentioned?

James Di Virgilio: 25:46

Craig, let's talk about strategy. Obviously, you had mentioned right in the opening that when you came onboard with Pixelligent, there was a very interesting landscape, all sorts of things going on -- legally, a bankruptcy, et cetera. How did you decide first that you were going to take on this project, that it was worthy of taking it on; and secondarily, how did you go about deciding what strategy to take to be able to take the IP that was obviously good, as you said, and bring it actually to market in a way that was going to work?

Craig Bandes: 26:14

With Pixelligent, I had just finished with Global Secure and was joining some boards and doing some angel investing. As I said, a friend of mine in the D.C. area, his lawyer said, "hey, there's this company that's doing some work for the University of Maryland. They're saying they have some of the most important technology they've seen come out of their incubator program, but they need to be helped. Can you go talk to them?" And so I sat down and I got with the team and then some of the advisors, and they had some pretty good folks. And the more I understood how they found themselves in that terrible bind, it was just a lot of really bad decisions, right? The technology was good. They actually had a financial backer who was really strong, who was still a supporter of the company. It was just a series of bad decisions. And then a lot of that driven by the inexperience, because they hadn't been in the business environment before -- they just started it right after their PhD programs -- I felt this company shouldn't die because of financially inexperienced decisions. So I decided to get involved. I had some time, of course it was on my time. Rolled up my sleeves, figure out what's going on. I've gone through the restructuring processes before. So I was able to jump into that and go talk to the bankruptcy judge and buy some time, and then just start to untangle the mess. And so I brought in these IP lawyers who said, "there's really important, valuable patents here around this brave new world of nanotechnology. And so there's value here if you can figure out a way to make the mess go away." So part of this job was at the end of the day, if we could get out of bankruptcy and the litigation, we might just sell off the patents and have a return and move on. Or we were trying to actually build something. At that point, I had taken a deep dive in "why had so many nanotechnology companies failed?" And at that point, most of them had -- about $4 [billion] or $5 billion of venture money went into a nanotech company circa 2000, about $12 billion of government funding had gone into supporting growing nanotechnology initiatives and universities and companies, and then another $4 [billion] or $5 [billion] or $10 billion [inaudible] these days went in with corporate, and very little came out. And what I realized was, taking a deep dive, is that a lot of the first round of nanotech companies looked a lot like Pixelligent -- brilliant scientists , nobody from a manufacturing perspective or a business perspective. And so really what I decided is that, if we could get in and find a way to make these products, these materials at scale and manufacture them, then there's potential here, because at some point there would be a billion dollar company here. In the world of nanotech, it just has to happen with as much money and talent and energy was going into it. And so if we could crack the manufacturing scale-up code, where almost everyone else failed, then we would have a shot at becoming a meaningful company. And so as part of that, we went after a very large government program just after getting out of bankruptcy, and it was a hail Mary, and it was one of the first programs focused on the manufacturability of a nanoparticle versus the invention of one [inaudible] . And that really launched the company. And since then, manufacturability is deep in our DNA as the invention of human service . And that's really what sets us apart. So when we have fortune 500 companies, can't talk about most of them, but one of them was [inaudible] and that many others come and visit us and kick our tires. They see that we're different because they can see our manufacturing lines right next to our R&D labs. And so part of it was, I felt that there was the potential to build something meaningful that could have a big impact, would help in the world of sustainability because of the way we make the materials and the efficiencies that they bring, and, ultimately, there were going to be some really big successful companies in the space. And if we can get the manufacturing down, that we would have as good a shot as anyone.

James Di Virgilio: 29:48

So, you build out this broad strategy, which was very well laid out right there. How does it go from that to something more narrow -- strategy into actual tactics, as you moved along through the curve of progression with Pixelligent?

Craig Bandes: 30:01

So you start with, "okay, we have to know that we can manufacture whatever, right?" So the first thing is to hire the right people. So I brought on, pretty early on, a great senior executive and a manufacturing group , understanding of our business. And I told them when you join, "look, here's the deal: walk down to the scientists , see what they're doing. And if there's anything that they're doing that you think won't scale, we're going to tell them to stop." And they came back and said, "there are a number things that they're doing that won't scale. They are using materials that are [inaudible] ... or they're so toxic, you can't put more than a gallon of them in the building, or you can be shut down by the fire marshal, or downstage processing, and environmental and safety and health issues that no large company will let you go into their building, from a manufacturing perspective. So very early on the tactics were, "okay, we're only going to make things in the lab that we have a 75% chance that we believe can be scaled, and not violate those issues of safety and scalability that are required to be in fortune 500 supply chains ." So I think that was the key first step around manufacturing, tactically. And then it was okay, how do we build a new manufacturing line that has never existed before that makes these nanoparticles at scale? At that point, we've made them like a beaker [inaudible] , right? How do you start to put these in large, 30, 50, 100, 200-gallon reactors that are making tons of material and still keep the same quality -- which is really what set us apart from everyone else in the world, with the quality of the particle? And so we spent a lot of time and cracked that code, and a lot of money to crack that code, both from that program we got from the government, and then more equity that we raised around it. And so, tactically, it was just really spending time stage-by-stage. And from the scale-up perspective, there are steps you have to take so that you don't just start with a coffee cup and go to a 200-gallon reactor. You start with a coffee cup, you go to a Crock-Pot , you go to a pressure cooker, all along the way to make sure that as you scale, you are able to control what's happening. And we did that very methodically. So from that perspective, I think tactically is what we did there. Then the other side of it was to get out there into the market, and really just explain that what our technology can do, because we didn't really know yet which customers in which markets were going to care most. But we started going out to conferences very early on; in generally the area of advanced materials and electronics, and slowly started to figure out after many, many of these trade shares and conferences, which areas that we were seeing the most pull from, and then we would focus our energy and capital around those. And we've kind of followed that same methodology throughout. And then we started seeing pull from Asia and, "okay, let's go over there and start meeting with central customers and partners." And then from there, "okay, we need a distributor because we need someone that can import this for us." And , and then if you start with one and then you've got two, and then you get five , right? And so you start with what is the big problem that we need to solve, or prove that we can solve, to get the credibility? And then what's the next one? And then what's the next one, and what's the next one? And then, tactically, bring in the right people to execute out all those plans.

James Di Virgilio: 33:03

Really well said. That's a nice curve of progression through strategy, down to tactics being flexible and nimble, but then really making sure that you solve, solve the code-breaking problem that either breaks you or breaks for you. And scalability is certainly one of those things that affects a lot of companies and it's often too late by the time they realize it. So lastly, now we're standing today where you are, you've built Pixelligent to where it is, of course you and your team and everyone working there, you've utilized all of the strategies and tactics. You've mentioned you have this wealth of experience in front of you and behind you. What are you looking at for Pixelligent into the future?

Craig Bandes: 33:36

I think we have a really unique opportunity over the next three to five years to become one of those first companies to really break out in a market that has been waiting for somebody for 20 years. We have the right combination of the right technology at the right time. When I say "at the right time," you know, the materials that we make, to get geeky for a second, they're referred to as "high index materials." It's a way for us to get more light into or out of the system or bend light in a way that makes something work better. And that was a(n) interesting concept. And that's kind of cool when we first started doing it in 2013, and now we have to have that in these next generation displays, augmented and mixed reality devices that we're all going to be wearing in the sensors that are moving into really becoming part of everything from self-driving cars and drones, and everywhere you touch there's a sensor... That all of these products now require the materials, the types of materials that we make, in a proprietary way. And so we're having some of the best companies in the world approach us about integrating that into their technology. Our challenge now is that we're supporting some of the biggest technology companies in the world with a very small, relatively small team, less than 50 people. And we have to scale that quickly now to not lose these opportunities, because they're now expecting us to look like the companies we compete against, which are massive companies: Dow, DuPont, Merck, and others at that scale in electronic material space. And so we now have to prove to them that we can deliver at that same level. Now they're saying they're bought in on the technology. Now they have to buy in on our capability to really deliver, to give them the customer support that they need, the quality metrics that they demand, and then the ability to supply them wherever they are around the world. So now it's a matter of, back to your question about strategy and tactics, and we have the strategy of where we want to go. We have the customers, and now tactically, how do we start to go do this? So, I was in Korea. I first shipped out of the country in a long time, three weeks ago, and was able to get an expedited quarantine time. And we closed a partnership with a large Korean partner who is going to be a manufacturing partner for us in Asia. Critical staff . We started that 18 months ago and worked through a number of them before we found the right one and had to go there to meet the CEO. And he had to meet me, and make sure that it was the right thing -- thank goodness it was. And so we're putting in place the infrastructure also on a global basis to be able to go do that and not entirely on our own, even if you have all the resources, all the cash you need, it still makes sense to partner, especially if you're going into new markets and new regions that you've never built anything in before. And so it's continuing to execute on what I think I have a pretty good handle on, of expanding the types of partners and stakeholders that can really help us execute a pretty big strategy on a global basis and realizing that you can't, and you shouldn't, do it alone. And just making sure you're picking the right partners and the right people to help you get there along the way.

James Di Virgilio: 36:26

And perfect. That's a wrap. Great job, Craig, great answers, really insightful stuff, really logical linear thinking, which makes sense from a finance guy. That's, that's how we tend to do things. And from Radio Cade, I'm James Di Virgilio.

Outro Speaker: 36:39

Radio Cade is produced by the Cade Museum for Creativity and Invention located in Gainesville, Florida. This podcast episode's host was James Di Virgilio, and Ellie Thom coordinates inventor interviews. Podcasts are recorded at Heartwood Soundstage, and edited and mixed by Bob McPeek. The Radio Cade theme song was produced and performed by Tracy Collins and features violinist Jacob Lawson.