



How to Start a Robotics Company

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Building robots are hard; building robot companies are even harder. Here are some tips and advice from those who've done it.

By Neal Weinberg

By all measures, there's never been a better time to start a robotics company.

Worldwide spending on robotics systems and drones will total \$115.7 billion in 2019, an increase of 17.6% over 2018, according to IDC. By 2022, IDC expects robotics-related spending to reach \$210.3 billion, with a compound annual growth rate of 20.2%.

Venture capital is flowing like it's 1999 all over again. According to the [PwC/CB Insight MoneyTree Report](#) for 2018, VC funding in the U.S. jumped to \$99.5 billion, the highest yearly funding level since the dotcom boom. In the category of AI-related companies, which includes robotics, startups raised \$9.3 billion in 2018, a 72% increase compared to 2017. Nuro, a Silicon Valley startup that is piloting a driverless delivery robot vehicle, announced in February that it [successfully raised an astounding \\$940 million](#) from SoftBank.

Stocks in robotics and AI are hot commodities. "We're really on the cusp of one of the greatest technological innovation periods in the history of mankind," said Bill Studebaker, chief investment officer at ROBO Global. "There's never been a more exciting time to be an investor in robotics and AI, where the rate of change and innovation has become exponential."

On the other hand, if you're itching to launch your own robotics company, the demise of high-profile robotics companies like Jibo, Aria Insights and Rethink Robotics may cause you to rethink your decision. (See sidebar: Why are robotics companies dying?)

According to the experts, these isolated failures are par for the course in an emerging market such as robotics, and should not be used to draw larger conclusions about the overall health of the industry. Eric Klein, a partner at the VC firm Lemnos Labs, asserts that we're entering "the golden age" of robotics. He points to a record amount of VC



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**Eric Klein,
Lemnos Labs**

investment, a record number of new entrants into the field, and a developing ecosystem that makes it easier and cheaper than ever to build robots.

While computer companies and social media giants have been launched in garages and dorm rooms, starting a robotics company is a fundamentally different business proposition. Everyone understands that robotics is hard in and of itself. Building a robotics company is even harder. Being able to build a science project is not enough. Having a great idea is not enough. “Ideas are a dime a dozen,” said Klein. “If you think you’ve created a new one that has never been thought of before, you’re probably wrong.”

In this report, we’ll present you with the keys to building a successful robotics company, but also point out the pitfalls.

FIRST, IDENTIFY A MARKET

“If you build it, they will come,” is a slogan that applies in the movies, but in the world of robotics, it’s bad advice. If you have an idea for an exciting new robot, the first thing that you need to do is figure out if anyone will pay for it.



Jason Walker,
Waypoint
Robotics

“Anything that’s technology for technology’s sake, there’s a huge risk it’s going to bomb,” said Jason Walker, CEO and co-founder of [Waypoint Robotics](#). Young entrepreneurs need to identify a business need and come up with “the most crisp and deeply piercing solution.” He adds, “If you’re lucky, there will be headroom to expand on the product offering to capitalize on additional needs, but you have to be able to solve a specific problem in a meaningful way right out of the gate.”

Oliver Mitchell, a venture partner at ffVC and a founding partner at Autonomous Ventures, says that his firm looks for mission-critical solutions. “I think too often people come out with an engineering background and pitch a technology instead of a value proposition,” said Mitchell. “We like technologies that solve a particular problem – hopefully a multimillion-dollar problem.”

In addition to knowing how to build robots, aspiring robotics entrepreneurs must also obtain what Mitchell calls “domain expertise.” In other words, knowing technology is only half the battle. Entrepreneurs looking to start

Oliver Mitchell,
Autonomous
Ventures



a robotics business need to have deep understanding of a specific industry (health care, manufacturing) or a specific business process (supply chain, inventory management). He says

startups can even raise early capital to get that domain expertise, but it's a vital step on the road to success.

The best way to determine if a company would be willing to pay for your robot is to take the direct approach – ask them. Mitchell recommends that fledgling founders make a list of 100 or even 200 potential customers, pick up the phone and starting calling.

You'd be surprised at how willing companies, even Fortune 500 companies, are to take the time to provide invaluable feedback. You might find validation for your idea. You might get suggestions that lead you to change course. And you might even come up with a potential customer who is willing to participate in a proof-of-concept or pilot project, which could lead to your first big win.

For example, when Tom Galluzzo was co-founding [IAM Robotics](#), he had a connection into the pharmaceutical industry, and was able to set up a meeting with the CEO of a major distributor of health and beauty products. That distributor eventually became his company's first big customer.

After all, most companies are facing intense competition, are dying to cut costs and improve their processes through automation. The impacts of an aging workforce and a severe labor shortage are being particularly felt in warehouse, factory floor and supply chain functions, where robots can play a key role.



Tom Galluzzo,
IAM Robotics



NEXT, BUILD A TEAM

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An interesting irony in creating a successful robotics company is that building rock-solid, reliable hardware is a given. What makes or breaks a business are often soft skills, such as team-building and leadership.

Mitchell said he evaluates pitches from young entrepreneurs on three criteria, in this order: team first, then product, then plan. Klein agrees. He says Lemnos receives hundreds of pitches a year, and funds about eight to 10 of them. The first thing he looks at is whether the right team is in place. Then he looks at the product itself and asks a number of key questions. How big is the market for this product? How well does this company understand the market? Does the market need this product? Even if it needs it, does the market want it? And does the company have a business plan for getting the product to market?

Klein said when a typical software company is getting off the ground, the founders ramp up by hiring clones of themselves, in other words, more software engineers. But with a robotics company, the founders need to build an interdisciplinary team with engineers from a variety of specialties all working together, which is far more challenging.

That's why some experts recommend that if you're thinking about starting a robotics company, your best bet might be to work in the field for a few years in order to get a sense for what effective leadership looks like,

and also to network with other people in the industry, so that when you start to build a team you have specific people in mind that you can call on.

Take Walker's career. He wanted to be a race car engineer, built robots in college, started out working in retail electronics, then joined iRobot as a test engineer for the third-generation Roomba. Through a shared interest in wakeboarding he became friends



Jason Walker,
Waypoint
Robotics

with iRobot founder Helen Greiner and in 2008 they left iRobot to start the drone company CyPhy Works. In 2015, Walker got the start-up bug again and left CyPhy Works to team up with Patrick Hussey, who was his former intern at iRobot, to launch Waypoint Robotics.

"I've worked in technology and robotics my entire career," says Walker. "It always comes back to people. It's hard to look at any piece of technology and have it dead-end at some place that doesn't include the person being served. It's all about people – customers and teammates."

While Klein has seen successful founders come right out of school, more often than not, industry experience "can make all the difference." Klein points out that running a successful robotics enterprise involves a wide range business skills, including sales, channel marketing, budgeting and demand planning.

[Worcester Polytechnic Institute](#) (WPI) has an entire infrastructure in place to help students commercialize their ideas. Todd Keiller, director of the [Office of Technology Commercialization](#), said robotics students take courses on business and entrepreneurship. In addition, a Tech Advisor Network lets students work with mentors, and various pools of funding are available to enable students to work on their ideas, get out and interview potential customers, and even provide early funding.

Of course, there's no one path that's right for everyone. Mike Gennert, who founded the robotics engineering program at WPI, said getting a few years of experience under your belt at a robotics or other tech-related company can be instrumental in helping a young engineer gain some perspective on how the business world really works and to start developing those all-important management and leadership skills.



CRACKING THE VC CODE

For Galluzzo, obtaining venture capital funding was the single biggest challenge he faced when he launched IAM Robotics. Galluzzo has an impressive list of credentials: a Ph.D. in robotics from the University of Florida, four years experience working in robotics at Harris Corp., and a stint at Carnegie Mellon University's [National Robotics Engineering Center](#) working on a DARPA-funded project designing autonomous robotic manipulation software.

In 2011, he began looking into commercial applications for his research into the use of robotic arms and hands to locate and pick up objects. Before he jumped into the business world, Galluzzo tapped into the resources available at Carnegie Mellon's [Tepper School of Business](#), where he attended seminars. He read "The Lean Startup," by Eric Ries, and did his own research on how to start companies. The key takeaway was to talk to customers before all else. Galluzzo found that companies were in dire need of robots to perform warehouse picking operations.

Despite having a great idea, a solid business plan and tons of experience, when Galluzzo and co-founder Vladimir Altman launched the company in 2012, their biggest challenge was scrambling to obtain funding. They struggled for the first couple of years, pitching in some of their own money, hitting up family and friends and getting by on \$100,000 in early funding when they needed more like \$1 million.

“It’s tough for a Pittsburgh company to raise money in Silicon Valley,” Galluzzo said. But he kept at it for a good five years and his persistence finally paid off. IAM Robotics scored \$20 million in Series A funding from KCK Ltd in 2018. The money will enable the company to leverage everything it learned from working with its first big customer, and expand into the broader warehouse robotics market, which is expected to surpass \$20 billion by 2024.

There are some specific do’s and don’ts when it comes to catching the eye of a venture capital firm. One way to look at it is to think of applying for VC funds the same way you would approach a job application – do your homework, customize your pitch, follow instructions, and be persistent.

If a VC firm has a specific format or template for presenting information, follow that format to the letter. VCs are swamped with pitches and the ones that fall outside of the desired format get discarded.

Don’t spam every VC you can find with a generic pitch. Try to understand what types of startups a particular VC firm specializes in. If a company only does B2B, don’t pitch a consumer robot. Also, make sure you have a good grasp of the recent history of the VC firm – if they just funded a drone startup, you need to think about whether they are likely to fund another drone startup, or at least you need to understand what the other company is doing so you can differentiate yourself.

Also, understand how this VC firm works in terms of how hands-on they are, and align that with your preferred style of working. In other words, if a particular VC expects to have daily contact, would you find that helpful or intrusive?

UP AND RUNNING

Once you’ve built a team, obtained some funding and are up and running, the challenges don’t end. In the fast-changing robotics industry, companies must be able to pivot. Maybe it’s in response to a request from a major customer. Maybe it’s in response to a competitor beating you to market with a better, cheaper product. Maybe the market has changed.

In the robotics world, the lead time between the creation of the company and full-blown production of a commercial product can be 10 years, which means that as much as you love your original idea, you can’t be wedded to it. You need to be able to adapt.

“You have to go in with your eyes wide open and be open to change perspective if the market changes,” said WPI’s Gennert. The good news is that the basic underlying robotics technology can be adapted to a variety of environments and business scenarios.

Another vexing issue for founders is whether they should hand over control of their baby to an experienced CEO who had the business savvy required to take the company to the next level. In other words, if you’re the next Larry Page and Sergey Brin, when do you bring in Eric Schmidt?



Tom Galluzzo
at EmTechNext
2018

That’s a conversation that you should be having with your mentors, your venture partners, but mostly it’s a conversation with yourself. Galluzzo says he had reached a point where he realized he wasn’t that interested in the financial and legal aspects of the business, and wanted to get back to focusing on technology. IAM Robotics already had a relationship with Joel Reed, a local marketing and business development executive who had been working with the company on a consulting basis. Galluzzo and his team hired Reed as VP of sales and marketing last February, and made the decision to offer Reed the CEO position in August.

Galluzzo, who is now CTO, said the move couldn’t have worked out better. Not only is Reed effectively managing the business, he has been able to recruit other people with business expertise to help enhance the leadership team.

FINAL WORDS OF ADVICE

Robotics is a tough business. Unlike the world of software, you can’t release a buggy 1.0 version and patch later. Everything has to work on Day 1. In many scenarios, you have to overcome some initial skepticism, maybe even hostility from employees who have to interact with this new technology.

Young entrepreneurs should look for mentors. Identify a successful entrepreneur, get to know that person and learn from them. “Network like

crazy. Know that you're not alone. Network with other engineers. Don't climb the mountain all by yourself, advises Klein.

"It's never not my job" is the attitude that Gennert tries to impart to his students. "If you're going to be an entrepreneur, you're going to be the one who calls customers, makes hiring decisions, and makes coffee in the morning. As the founder, you do whatever it takes to make the company succeed."

Mitchell adds that robotics is an exciting field where innovation can improve the quality of life for everyone. "But at the same time, you need to roll up your sleeves and do the grunt work to get there. It takes great leadership to harness teams and mind around a singular vision. It also requires perseverance and tenacity."

Galluzzo said he's optimistic about the future of the robotics industry, which has the potential to fundamentally change the nature of labor. He sees trillions of dollars worth of opportunities out there for young engineers who have the passion and drive to launch their own robotics company.

WHY ARE ROBOTICS COMPANIES DYING?

That was the scary headline from a [recent article in Forbes](#) that tried to find a larger meaning in the demise of Rethink Robotics, Mayfield Robotics, and Jibo. After the article appeared, high-flying drone startup Aria Insights crashed and burned.

The question is this: If Rethink, founded by AI research superstar Rodney Brooks, could go under; if Jibo, which raised \$70 million, could go under; and if Aria Insights, founded by iRobot co-founder Helen Greiner, could go under, doesn't this cast a shadow over the entire industry?

The short answer: No.

- Mayfield Robotics and Jibo, which were making social robots for the consumer market, were simply wiped off the map by Google's Echo, which did most of what these robots did, but far more cheaply – Jibo's list price was \$899, compared to about \$150 for an Amazon Echo. "Jibo got Alexa'd," says VC Oliver Mitchell.

- The problem for Aria Insights (and other drone companies) is that the technology worked almost too well. Drones are able to collect tons of data, but, unfortunately, the backend systems required to make business sense of all the data are still immature. As Aria CEO Lance Vanden Brook put it: “A number of our partners were collecting and housing massive amounts of information with our drones, but there was no service in the industry to quickly and efficiently turn that data into actionable insights.”
- There are two types of robots; general purpose robots and single purpose robots. What we’re discovering the hard way is that companies have the skills today to build single-purpose robots and there’s a market for single-purpose robots. But general purpose robots might be simply beyond our capabilities at this point in time, says Eric Klein, a partner at VC firm Lemnos Labs. Rethink tried to build general purpose robots, but simply ran out of runway before its funding dried up.

— Neal Weinberg