# Why 97% of Hardware Startups Fail and 5 Success Stories – ROYBI Robot, UVEye, and More!

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Electronics development and manufacturing is no easy task, certainly not impossible to do, but it presents many challenges.

As mentioned in FORBES, 97% of seed crowdfunded hardware startups fail.

You may be wondering why this is?

For startups that make it to the market, the leading cause of failure is a lack of market need.

For new hardware devices, there's just so much to consider.

Nonrecurring engineering costs can vary considerably depending on the electronic device you're looking to manufacture.

It can go from some US$ 15O,000 to US$ 1,000,000

Prototyping is a lengthy process on its own. It will undoubtedly require many iterations, going from POC through mock-up prototypes and culminating in an MVP.

A proper selection of components is vital for the long-term survival of new electronics that make it to the market.

Components determine 60% of the cost your product will incur over its lifetime.

Oh, and selecting the right components is not enough; you have to learn to navigate through crazy long components lead times of up to 32 weeks.

No wonder some people say, why would anyone even go into electronics manufacturing?

These are just the technical reasons people also fail due to personal reasons as well, that have more to do with personality and the way in which they work.

## The main pinpointed reasons are

1. Lack of a focus in the right directions Or to much focus in two many directions

Sometimes people can get excited and find themselves pursuing too many things at once, which is natural considering the huge scope of options that will be given to you upon starting your startup.

However, even if all of these directions have there merits a business can easily fall apart when someone is trying to do too many things at once.

As normally pursuing too much can lead to everything being pursued not well made.

An equal problem can come about when pursuing a direction entirely, that may be the wrong one. So always do your research.

2. Overestimating there need for help

Sometimes people struggle to understand when to listen or when to seek help from people who are more knowledgable in certain areas than they are.

No one person is perfect in everything and a wise person knows that seeking help does not mark an inadequacy but instead shows a deep intelligence.

### 3. A lack of passion

Sometimes people may decide to start a start-up due to the fact that they believe there's money in it, or that it will do well, or even because it makes the most sense.

However, problems can arise if that is the only reason and they don't have any real passion or interest in what they are creating.

A startup is a lot of work. Therefore the thing that at the end of the day may be the difference between success and failure is what is driving you.

When its passion and love for the product, that may be the very thing to keep you going when the going gets tough.

### 4. management

One example would be when people start startups with their friends, friendship when put to business can become very difficult, you may find that you have differing ideas, different ways in which you want to do things which can result in issues where your employees are given ambiguous direction.

Another example is a person with a really great idea for a startup but with no knowledge of how to manage people.

It's really important to have strong management when starting a business because there is such a thing as the trickle-down effect, if it's chaotic from the top, it will be very hard to grow your business as well as keep it structured.

5. Lack of knowledge of all the areas of business. Sometimes the person trying to start a startup may not know about the financial aspect or marketing etc.. if that is the case, make sure you have people on your team that do, because without full control of these aspects it's going to be hard to get your business afloat

 I hope instead of this article freaking you out you are instead more aware of what your in for and how to avoid some of the pitfalls that could make it difficult for you.

Now for some inspiration!

Well, if you do make it, rewards are worth it.

We reached out to successful entrepreneurs that went into the electronics business and made it.

We asked different questions to understand how their product ideas came to be, the most significant challenges they faced, and how they overcame it.

And finally, asked them for advice for those who are just starting in their electronics product development journey.

We'll be updating this article as more stories come in.

## Roybi – Robot

- Company: Roybi Robot
- Interviewee: Elnaz Sarraf
- Electronic: Roybi– the world's first smart toy to teach languages and STEM skills.

**How did you come up with this product idea?**

I noticed that our education system needs a fundamental change, and through talking to experts, I learned that change starts with early childhood education.

Every child has his/her own unique set of skills, and our focus needs to be on their individual capabilities and, thus, the importance of individualized learning.

We saw a significant gap in this area and decided to use technology and artificial intelligence to bring about change to help children, parents, and teachers.

We developed Roybi Robot to interact with children as young as 3-years-old because early childhood is the most critical age in a child's growth and future success. We're always engaged in thinking about the benefits of robotics and AI in early childhood education.

**What was the biggest challenge you encountered in the product development process?**

I've experienced many challenges in growing the company, but I think the main challenge was creating a practical robot design.

We had to consider many aspects of the design, size, specialized compartments, weight, and appearance.

Because our product is designed for young children, we wanted to make sure it is lightweight, attractive looking, and safe.

Our customers might be young, but they are very intelligent.

We knew from the beginning that if our robot is not designed for them, our goal and product will not be impactful and effective in what it wants to achieve: quality and individualized learning.

**How did you overcome it?**

We worked together as a team. Our team is very diverse.

Each team member has a different set of skills and comes from diverse backgrounds that give us an advantage because we could create many more options and put them to the test to make sure we finally have the right version.

**What advice would you give to someone starting in hardware manufacturing?**

Continuously test and make sure you go through all the Product Development Steps without eliminating any steps.

Start with a small number of prototypes, test those, build another 50–100 units for testing, and then do a pilot run about 250 units to see the results.

When you have your product, don't just test it in your environment.

Try to find friends, family, bet testers in different locations and settings so that you can further test your technology under different scenarios.

You'd be surprised how many issues you may find in each testing round.

When you are ready for mass production, always keep in mind that you must have some extra cash in case some parts need to get redone or if any unforeseeable circumstance arises.

## <u>Uveye – Vehicle Inspection Devices</u>

- Company: <u>UVEye</u>
- Interviewee: <u>Ohad Hever</u>
- Electronic: Artemis – Tire Inspection

**How did you come up with this product idea?**

We already had a product scanning the undercarriage of a vehicle for security threats or mechanical issues and got several requests from clients to build a product based on Artificial Intelligence to inspect the tires for damage and tread depth issues.

Imagine leaving a car wash, driving next to a system, and being notified that your tires are too old and worn out, a dangerous hazard, without you even knowing.

**What was the biggest challenge you encountered in the product development process?**

When creating hardware in the automotive industry, it needs to be robust and operate even in the harshest weather conditions.

We have built Artemis to work inside or outside, rain or shine, and still, deliver high-resolution images of the tires that can be analyzed by our AI software and deliver great insights.

We have been working on Artemis for over 2 years and have upgraded it several times.

Each time tailored to assist in another use case including car manufacturers, bus fleets, delivery fleets, car dealerships, auctions, and logistical companies.

**How did you overcome it?**

We installed the right mechanisms, sensors, and materials to keep the system fully operational with all of our use cases and clients no matter what the weather, temperature or environmental conditions are.

*Artemis – Tire Inspection*

**What advice would you give to someone starting in hardware manufacturing?**

Do not assume you know what your client needs.

Try to be in touch with the field and adjust your efforts according to your use cases.

Your clients will know best which specifications they need and how the hardware is going to be mounted.

In our case, our Artemis device can be installed in a drive-through entry lane to a dealership car park or at the bus parking lot. We needed to understand this and work accordingly.

## <u>Lithion Power</u> – Providing Lithium Batteries for E-bikes and 3 wheelers

- Company: <u>Lithion Power</u>
- Interviewee: <u>Chandrashekhar Bhide</u>
- Electronic: Battery Management System – BMS-16 Cell

**How did you come up with this product idea?**

We started developing these devices because we did not find good quality ones in India. Most of these products were imported and were not configurable or even dependable.

It took us around 15 months to roll out the first commercial product, BMS for 16-cell.

The next few product variants (i.e., BMS for other cell configurations) were done relatively faster as we had figured out the basics in the first product.

**What was the biggest challenge you encountered?**

Our product development process was set back by a month because we got stuck in, at what the moment was, a very complex technical issue, and it took our team quite some time to figure it out.

The issue was a faulty LDO (Low Dropout Regulator)

**How did you overcome it?**

During the initial troubleshooting phase, there was no reason to suspect that the LDO could be faulty, as it was from a reputed source.

But when the problem persisted after multiple changes, we started eliminating probable causes one by one.

And that's when we understood that the LDO was faulty. It seems trivial in retrospect, but it wasted a lot of time & effort.

*BMS – NQ16*

**What advice would you give to someone starting in hardware manufacturing?**

We had to do multiple iterations of our products over several months & with different customer segments.

So, our advice to startups is – do rapid prototyping & test it out with a pilot customer (could be even for free, their early feedback will significantly help your future product versions)

## SKUMA – Recreates Alkaline Mineral Water at Home

- Company: <u>Skuma</u>
- Interviewee: <u>CEO and Founder Alexandre Yunus Mahé</u>
- Electronic: Skuma Recreates Alkaline Mineral Water at Home

**How did you come up with this product idea?**

When I first moved to the UK following the completion of my degree in engineering, I was shocked to find a massive consumption in bottled water in a country where the tap water is of excellent quality.

I was set on a mission to understand the real reason behind this wasteful consumption and what pushes customers to purchase a free commodity.

After months of research, two reasons were apparent, taste, and more importantly, trust in bottled water.

I then decided to form a team with a couple of engineer friends who knew a thing or two about product development. We then managed to come up with the **concept for Sküma**. A device that transforms your **tap water into** water with the same mineral composition **as Evian**.

### What was the biggest challenge you encountered?

At first, we managed to successfully secure a couple of grants from the UK government and the Canadian one, which allowed us to take our idea to the next level.

We also managed to get selected by the Design Council for their 2019 Spark hardware accelerator program.

But like most of us know, **building a hardware startup is much harder** than software-based startup (or SAAS), and money is vital.

We struggled for more than six months to raise additional funds, which slowed down our development tremendously.

### How did you overcome it?

What might seem evident to most was not for us.

We were dedicating all our efforts to raising money. While we were continuing the device's development, 90% of our time was dedicated to contacting investors who would ultimately not follow-up.

 About four months into the process, we decided to change our strategy and focus on bootstrapping our development with whatever we could gather as funds.

We bought a 3D printer for £200 and started to work on our visual prototype and transformed it into a fully functional prototype. This prototype allowed us to share our vision more clearly when approaching investors.

This clear approach led us to finally close our pre-seed round of funding for a pre-money valuation of more than **half a million pounds (£600,000)** from a Hong-Kong based water purification company.

### What advice would you give to someone starting in hardware manufacturing?

Our experience with raising funds was an unpleasant one but one that we had to go through like any company.

The lesson to be learned is not to focus your time on raising money but instead build the product.

Unless your goal is an exit in the next X years and raising money will directly help you.

Develop your hardware because that is what you are ultimately selling. **Everything can be bootstrapped and even if the result is not the best or even close to being satisfactory, continue improving until it is enough to get you to the next step.**

## Tanvas – Tactile Experience with Multi – Touch + Haptics

- Company: Tanvas
- Interviewee: Joe Mullenbach – Senior Mechanical Engineer / Product Manager at Tanvas, Inc.
- Electronic: The first surface haptic touchscreen for digital signage and conference rooms.

**How did you come up with this product idea?**

We wanted to produce a touchscreen and display module that would fit into a kiosk product for digital advertising experiences.

Tanvas produces a haptic touch sensor. There were many non-haptic touchscreen modules on the market, so it was essential to find a contract manufacturer that made a similar product to what we were trying to build.

We met Mimo Monitors at an industry trade show. The company not only had an existing product that exactly fit the specifications we wanted, but they also had another desktop monitor product – the Mimo Vue – that would make a good development kit for us.

The partner fit was there from the beginning, and their team was excited by our technology.

Instead of hiring Mimo Monitors as a contract manufacturer, we worked out a licensing agreement for TanvasTouch technology, and they became a customer.

**How many prototypes did you have to do?**

When we started with Mimo, we already had the first round of touchscreen prototypes produced.

From there, we had two additional formal rounds of hardware prototypes before production. It's hard to count individually since parts get modified, replaced, broken apart, and reassembled during development.

But including those that we made to test for consistency and reliability, we produced around 75 individual pieces of hardware for prototypes, with countless firmware and software variations.

**What was the biggest challenge throughout the product development process?**

Having Mimo as a partner allowed us to focus on our unique value-add of designing revolutionary haptic touchscreens, while they handled all of the non-touchscreen manufacturing and supply chain challenges.

These challenges are not trivial for a startup, especially in a technical and price-sensitive industry like electronics.

 We also avoided much non-touchscreen product development work, tooling expense, and inventory expense using the majority of the parts directly from the Mimo Vue.

We fitted exactly into the footprint of an existing product, though, and this did present some integration challenges around the physical layout, connectors, and power.

Ultimately, however, our touchscreen and controller board dropped directly into the Mimo Vue to become the Mimo Vue with TanvasTouch.

The big challenge that we faced in development was around the ability to iterate on touch panel design.

There is a high upfront tooling cost to make a glass touch panel, with very long lead times.

We had to decide on the touch panel design early on in the process and then wait. Once we got it back and tested it, we learned more about how we could optimize it.

Because changing it wasn't an option, however, we had to invest more effort in other areas like firmware design, and specific improvements had to wait for the next product altogether.

The slowest, hardest to change thing ends up being the bottleneck that drives your development's pace and limits the improvements you can make.

**What is one advice you would give to hardware startups?**

1. Identify where your most significant value-add is as a technology or as a product and make sure that your engineers are spending most of their time there.
2. Identify your design bottleneck, and solve those problems first. Figure out how to make it easier and faster to iterate on your bottleneck through sample runs, simulation, or by pursuing parallel design paths.

As you can see through these stories, although the products vastly differ from each other, the people  interviewed seem to share similar sets of rules and ideas around their process so that they have been able to maintain the original goal and purpose of the product from the beginning to the end.

I hope these insights give you the inspiration and the knowledge to start to your own journey.