It was January of 2001 when the rumors began trickling in. Dean Kamen, the celebrated inventor of the iBOT powered wheelchair, was hard at work on a revolutionary new project. Tech titans from Steve Jobs to John Doerr predicted it would be bigger than the PC, bigger even than the internet. Anticipation built for the better part of a year until the mysterious project was finally unveiled in a December appearance on Good Morning America.

Project Ginger, as it had been called, was revealed to be the Segway Human Transporter. A self-balancing two-wheeled scooter with a top speed of 10 miles per hour, Kamen saw his new invention as a groundbreaking mode of transport for busy urban dwellers sick of looking for parking spots and paying for gas. On the face of it, it seemed like a great idea.

But then, reality set in. The scooter had a price tag of $5,000. At 100 pounds, getting it up the stairs was basically impossible. It also looked pretty silly. But perhaps most troubling, cities had no idea how to regulate it. Did the Segway belong on the sidewalk or in the street? Did it belong at all?

To justify its $100 million development cost, Segway aimed to ship half a million units in the first year. But six years later, the company had only sold about 30,000 scooters.

So, what went wrong?

In this episode of Innovation Decoded, we break down the new technologies that are transforming the way we live, think and work, and dive into the high-octane world of product development through the lens of Industry X.0. What’s that? Eric Shaeffer, a senior managing director at Accenture and head of the company’s industrial practice group defines Industry X.0 as the digital reinvention of industry, through smart, connected, living technologies that transform the way products are designed, engineered and manufactured.

Industry X.0 is really about the complete transformation of the industry. And by that I mean the way we interact with customers will be completely different tomorrow; by leveraging digital channels, our operations will be completely transformed.

Any mass-market product needs to be designed, prototyped, tested with consumers, tweaked, and tested again. This process can take years. And after everything, you can end up with a dud like the Segway.

But enough about scooters, let’s look at something we use every day. What does it take to design, say, the seats in a car?

 Believe it or not, the bucket seat is one of the most complex systems you’ll find in a car. Next to the engine itself, it is the most difficult and time-consuming component to engineer. Yet for all the effort and resources that go into its design, the car seat is a gratingly imperfect product. In an age of hyper-personalization, it is deeply impersonal. In an era of smart, connected everything, it’s about as high-tech as a sharpened stick.

So why do car seats veer so far off the road of innovation?
We have several internal marketplaces within Accenture that we've spun-up over the last couple years, and we were able to tap that internal market to reach out and gather a diverse set of ideators that could come together and bring us a product concept around what would make the next best generation of car seat design. When we did that, one we reduced the cycle time down from several months, which is typically what it runs, down to two weeks.

In leveraging Accenture's hive mind, Mary and her team did more than shave a few months off a clunky and convoluted cycle of market research, focus groups and brainstorms. They produced a better product concept. Their proposed seat had features like device connectivity, embedded sensors, and safety alerts. You know, things real people might actually want and part and parcel of the Industry X.0 revolution.

I think the proof in the quality of what they were able to put forward is, as we were talking to our clients, some of them are car seat manufacturers, and we got extremely positive feedback back from those car seat manufacturers saying, 'We've been thinking about this on the order of years, and what you came up with, what you developed is very much on track with the same things that we're thinking about from a car seat design standpoint.'

Of course, the concept of crowdsourcing product ideas isn't altogether new. On platforms like Kickstarter and Indiegogo, it's a sacrosanct part of the development process.

Sarah Meister is the hardware design and technology outreach manager at Indiegogo.

Every campaign is directly influenced by their user comments. Some people decide that they will pivot a product. Other people realize that, all they have to do is add a few more features or perhaps like a campaign doesn't hit its goal and they need to go back and retool something and then, relaunch. I mean I think it's real time, proof of concepts or proof of retooling your concept.
Consumer input allows brands to get a sense of who their customers really are, both as buyers and technology users. It tells them what products they already have in their homes; which needs are adequately served and which are neglected. And it enables companies to pivot early, when it’s still cheap to change direction.

I have seen in real-time campaigns, having a really engaged user who speaks their mind and, informs them of what truly may be wrong with the product and saving pitfalls for their post campaign production process that, maybe they otherwise without those users or commenters, wouldn’t have been able to navigate around.

Imagine the time and money Segway could have saved if someone had asked, “Does it really make sense to operate this on the street?” Or if Apple fans in the 90s had said, “This Newton thing… probably not a great idea.”

Platforms like Indiegogo demonstrate that product conceptualization in the era of Industry X.0 can no longer be the closed, insular process championed by the manufacturers of yesterday.

But what happens when it’s time to move past the idea phase and into the development process? That multi-year car seat? A big chunk of that lead time comes down to engineering and prototyping.

Back at Accenture Labs, Mary is working on that too. She thinks a major bottleneck is the fact that engineers work on two-dimensional screens to draft three-dimensional schematics. To address that, her team created a digital connector—a piece of software that translates a 3D model into an interactive digital twin, viewable in virtual or augmented reality.

You could have your entire design team all looking at the same model and working together on this 3D digital twin of your product, and engaging with it. Then that also becomes important for the last piece around prototyping. Maybe before you even build a physical prototype you can do a prototype using this rich immersive technology.

That last part is key. Physical prototyping is one of the biggest time sinks in the entire development process. Think back to art class when the pottery wheels came out and everyone had to make a vase.

You’d mold your clay, spin it into shape, bake it, give it a glaze, then bake it again. Now imagine that instead of a vase, the assignment is to make a life size bucket seat. But you’ll have to make a few. And this will go on for months.

Not a very agile process. But for many manufacturers, it’s the reality of prototyping a car seat.

It would take someone a lot longer to move pounds of clay than it would for me to do some mouse clicks. With VR, you get to a much better result quicker.

Raymundo Burgueno is a 3D design consultant. He’s modeled the interiors and exteriors of BMWs, Hyundais, Audis and more.

To be clear, Raymundo doesn’t think clay modeling is going anywhere. Auto manufacturers will always rely on physical prototypes. But he thinks they should rely on them way less. Does it really make sense to build a new model every time there’s a minor design change?

You stay in the digital process much longer and once the designer gets into the VR headset, he could be like, ‘Okay we’ve got to move this back. We could do something with this. This looks too skinny, this looks too that.’ If you still had a traditional workflow with clay, by the time you hit clay you’re in a much better spot. It’s really hard to analyze a design with just a monitor. But now with virtual reality, you find the errors much earlier so you can fix them. It’s much faster because before you didn’t have the sense of what this design looked like in 3D until you actually took the time to get a physical prototype going. Now that has eliminated months of work. That’s cut back a lot of the cost and has helped companies get to a better result, much, much quicker.
Also, it's pretty impressive. In a YouTube video, Raymundo walks you through his virtual design studio:

Here, we just see a very minimal trunk facial change, but obviously you can make it so it's a full wheel base change, a different package change. And you know, it's really beneficial to compare them side by side like this and it really gives you a sense of, if you like where this car's design direction is going. And you can stop it before any mill touches any clay.

Raymundo is standing in a sprawling, futuristic workshop like something out of an Iron Man movie. All glass and steel. At the center of the room parked on a rotating platform is a stunning sports car in powder blue. With a flick of a motion controller, it turns gunmetal gray.

None of this feels like a toy. In this virtual place, Raymundo is evaluating real schematics. He's making actual decisions. This is what it looks like to design in the era of Industry X.0.

This really starts changing VR from gimmick to some tangible results because you're really starting to understand the form that's in front of you in a 3D sense.

So, what did we learn?

Crowdsourcing: clearly awesome. VR modeling: super fascinating. But what do these things really mean for institutional manufacturing? Can market incumbents be expected to become as agile and innovative as a crowdsourced startup, or a consultant like Raymundo?

I'm having more and more conversations with some of those traditional players where they're looking for innovation, they're trying to drive innovation, but they are running up against a lot of the traditional barriers: lack of leadership, drive, and vision towards innovation, dedicated funding towards innovation. Sort of the top-down focus around how are we going to actually shift the business, and move into things like taking advantage of crowdsourcing. If they don't get on board with these kinds of things, and they have these three-year long product life cycles, they're not going to be competitive, and they're not going to align with their customers' demands.

Remember Segway? In the end, they too learned this lesson, albeit after a pretty painful initial roll out. The scooter eventually found a home in various niche markets. Meanwhile, the company took to heart the criticisms of its inaugural product and released the S1, a cheaper and lighter option far better suited to the original goal of creating an efficient mode of urban transport.

The transformative concepts and technologies underpinning Industry X.0 have heralded a new era of product design, defined by a streamlined development process and an emphasis on customer outcomes.

I think where Industry X will help is looking at ultimately the outcome and the experience for the end user.

Change is coming, make no mistake.

Industry X.0 is not a hype. It's a reality … ready or not, it is happening.

This has been another Innovation Decoded by Accenture. Join us next episode, when we'll uncover more stories of how Industry X.0 is rapidly transforming business.