



Stanford eCorner

Innovation By Vertical Integration

Jesse Levinson, Zoox

May 17, 2017

Video URL: <http://ecorner.stanford.edu/videos/5308/Innovation-By-Vertical-Integration>

Jesse Levinson, co-founder and chief technology officer at Zoox, discusses how creating everything in-house is intended to give the autonomous-vehicle startup a strategic advantage, likening the arrangement to Apple's decision to control all aspects of creating the iPhone. For such a complex undertaking, Levinson says vertical integration makes sense, especially in order to introduce true innovation.



Transcript

is that nobody has solved this type of problem before. There's a big gap between autonomous features that you can get on a car today and then true level-five mobility, which means you get in a vehicle and it takes you where you want to go, and you really don't have to do anything. And in fact you can't even do anything other than say where you want to go. Or "hey, I wanna get out of the vehicle." From a startup perspective, one of the really exciting things is that we get to do the hardware and the software and the service jointly and holistically. And I think that sometimes people don't appreciate how big of an advantage that is. If you look what Apple did with the iPhone, they didn't just write a new operating system and put it on a Motorola Razr or a Blackberry and they also didn't make a new hardware device that was running Windows Mobile Phone from 2006. They could have done either of those things, but I don't think it would have made nearly the impact on the market that they were able to achieve with the iPhone. I think with autonomous vehicles, especially fully autonomous vehicles, I think that integration between hardware and software and the user experience is even more important than it was with cellphones. And so one of the fun things that we get to do but also the very difficult things is we get to think holistically about where do we put sensors? What type of sensors do we need? How much computing power do we need? It's probably more sensors in more computers than you're gonna be able to buy on a car in the next couple years. Because their business model is very different.

We don't actually sell these vehicles to customers, we own and operate this fleet and then you can use them the way you use Uber and Lyft, they'll just hopefully be much better and even cheaper to operate because you're not paying the driver. So we do need to develop our own software, our own AI, our own algorithms, we're not using Mobile-i or anybody else's AI technology, it's completely developed in house at Zoox. When it comes to computers and sensors, we as much as possible buy things off the shelf or work with technology partners to get access to their upcoming products. And then when it comes to the sort of physical mechatronic layer of the vehicle, it's also really powerful that we get to design a level of robustness and some amount of fail operational into that design that cars today are not built for. Cars today are not built to drive 100,000 miles a year for four years, and they're also not designed to be necessarily safe when a whole bunch of components might fail. The good news is, we don't have to reinvent, for example, the entire concept of an electric car the way Tesla had to do. What Tesla did 10 years ago from a vehicle-engineering perspective was quite amazing. Very, very difficult, and there was really no supply chain for EV technology then. In the last decade, Tesla and now a bunch of other companies, make electric cars at quite some scale, so if we're looking for batteries and motors and steering columns and these sort of things, sometimes we might need to innovate a little bit with the supplier, but for the most part it's about building a new architecture but not reinventing every single hardware component in the vehicle.