Why it's not about self-driving

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In "How to be Rich" Jean Paul Getty expressed his excitement about enormous advances in science and technology at the beginning of the 20th century. The 21st century seemed to start in an equally exciting way, for example the self-driving car is attracting a great deal of attention lately. When I was about 14 years old a friend of mine told me that if KITT had existed, she'd have bought one. I wasn't surprised - every kid in my neighborhood wanted KITT and everybody wanted to be Hasselhoff. Moving to the US meant dealing with everything supersized; the smallest car at the airport car rental was bigger than anything I'd ever driven. I really wanted a CarOS: a software featuring a button which would get me from A to B with no hassle. I promised myself that when a self-driving vehicle like this becomes available, I would become an early adopter as soon as my wallet would let me.

Some commentators predict how such early adoption of CarOS may unfold:

I look at the technology market, and I tend to disagree.

A self-driving car is a really big thing. We have all watched Knight Rider, Star Trek, Star Wars and Demolition Man. Flying or driving, the vehicles in these productions are self-driving, with full intelligence, and most of us probably never believed that we would live long enough to experience them in real life. But self-driving cars are here; more and more companies are going to enter this space. But are they competing for the release of a CarOS? Not really.

While movies serve as a great start for technology innovation (try watching Star Trek and notice how many things came true) they don't show how these machines were engineered. Those of us who followed the history of Google's self-driving car know that this technology came from sweat and pain; beginnings are never easy. It took 10 years to perfect the technology, and it will probably take another 5 to 10 years to get the cars on the street. Perhaps even more. The prototypes are working, but with the car needs to come a law, which might be the more difficult part of the process (If the self-driving car crashes and injures

somebody, who's suing who?) So the question is: Are the Googles and Apples of this world willing to wait so long? Maybe. Is it necessary? No.

Lets start by asking: Exactly why are Google, Apple and others building cars? The answer is both simple and complex in the same time.

When we look at how big and powerful Google and Apple have become the interesting question is: Where else can these two companies go? Google needs a new space to distill its search, display its ads and make people less aware of its presence, yet still be present. Apple on the other hand will want to continue driving its brand into TV, music and fashion. Other possible segments are: space, biotech, medicine, food, and some of these are already being tackled, but let's stick to cars for now. Aren't the cars the next product portfolio of Google and Apple? I don't think so. There are other ways to provide a return on investment.

I had a chance to tour ARM LTD during my internship at Cambridge University. The company is pretty small, it seemed like two buildings and your uncle's front yard. The whole company world-wide has 3300 people who have helped to make ARM one of the most powerful companies around. Why?

ARM licenses the design of its chips. Licenses, not makes. It's something akin to paying for a secret apple pie recipe without actually getting an apple pie. The ARM apple pie recipe was pretty darn good and people started to buy it as if they were starving. I mean trucks of apple pie ended up everywhere.

Today ARM's microchip architecture is at the heart of basically every single smartphone, every watch, and every gizmo you have. If you have a house with electricity, you have at least 5 ARM chips around you which you're probably not aware of.

The ARM business model is trivial: if the gadget is powered by their stuff, the chip must have a nice sticker similar to Intel's "Intel Inside", and the maker of the gadget pays a royalty for it. Imagine if we were to tax air and force every room to be tagged "This room has Air Inside". This is how popular ARM is and how their business model works.

It makes sense for the self-driving car to follow this model. Amazon Prime costs Amazon a lot, but drives so many customers to Amazon, that it makes sense. I feel that self-driving cars will be like that too. Big money put upfront increases degree of risk, but can result in big returns later. Of course tech maven's first cars will be just that - cars. Expensive, as slick as the first Tesla, but still cars. And to get it out to other countries, the price must be right, since the USD exchange rate is still unfavorable. But the more that technology matures, the less that self-driving cars will be a thing. Is Uber, Apple and Google aware of this? Sure they are, but the first step still has to be taken, and that's happening now.

The equipment for self-driving in Google's car costs 150k USD. That's a lot of bills for a bunch of electronics. And that price excludes the car's body, meaning no rims, no windows, not even a nicely padded steering wheel. Will the

consumers who already own cars get new $200k toys? Perhaps. Would they buy $35k self-driving cars? Sure they would! The only way to get such a cut in price is scale: if you make a purchase order for 100,000 self-driving modules, you'll get great cost savings. So the only way to push the innovation forward is to get the technology out of the door to as many people as possible and have them use it. Since most of the world is powered by other car brands, it makes more sense to license self-driving software to everybody and have them use it. Pay royalties to Apple and Google and keep pulling prices down.

Why would these corporations want to give us such toys having risked so much capital? The average American person spends 101 minutes driving every day. Wouldn't you rather be watching YouTube than driving? Exactly. This is when Google comes into the picture. Wouldn't you rather be watching TV shows or listening to music? That's where Apple fits into the play. When you think about the benefits these corporations could gain by gathering in driving Americans, you'll have a clear explanation of why a self-driving car makes sense for them.

Tn years from now everybody in the US will have a self-driving car. Hard to believe? It's fully doable. If SpaceX took 13 years to get a space technology which gives us rocket reuse, self-driving car's 10 years is about right. And NASA is buying SpaceX technology. Read it once again: **NASA** is buying rocket technology from a 13-year old startup. What's next? I believe that experts in AI, machine learning, computer vision, maps, navigation will all stay in Silicon Valley, because this is this kind of software Silicon Valley is and will be great at. I believe Tesla, Google, Uber and Apple have already grown their armies through the use of qualified car experts and out of this will come many software and systems distributions which kinda work. Someone somewhere will realize that proving automotive technology to be verified, stable and not dangerous is very expensive, so it'd make a perfect sense to have one CarOS rather than two, since it's not really about driving. Once again: getting from A to B won't be where the value comes from. The value of the Operating System now is 0 (zero): as long as it provides thread scheduling, protection and decent performance on your computer. That's why nobody really sells operating systems anymore. It's what runs in the OS that matters, and the CarOS will be the same.

Does this mean that Google has done the research and Mercedes and BMW will just license this technology? Of course not. Every day we can see how Bell Labs, AT&T, Verizon, Comcast and others have built a real infrastructure: channels, pipes, cables, shafts and all this boring, but so necessary stuff. And here comes Uber with 0 material goods, AirBnB with 0 material goods and others with 0 material goods who use their cables and generate so much money. But just like Apple is buying Samsung's elements for their iPhones and suing them at the same time, Mercedes and BMW could license the self-driving modules. How about suing?

The real battle, in my opinion, will be not about CarOS, but PassangerOS: the thing that faces the passenger. Just like AT&T doesn't want to be just a cable and shaft provider, BMW won't want to be a pretty metal box maker. They'll

want to get their cut for the user's time.

Here's the bigger question: will automotive companies and software companies reach a deal where they both get cuts: "50/50, since we provide mechanics, and you provide the software". The answer might be "No", in which case we'll get Google and Apple and others building their own ... everything.

I like to think in terms of analogies. For example, I observe a trend here, a trend there, and I try to extrapolate it. So an analogy would be: if all unicorn businesses are running out of space in their industries, who will be the next guy to start building cars? I'm sure Facebook will end up with a car team at some point. Microsoft probably as well. How about car makers? It seems that a natural step for BMW, Audi and Mercedes would be to start thinking about how to deliver a nice, bloat-free PassangerOS and how to attract users to it. And then show them movies, play music and other stuff. Will Mercedes become the new MTV? If BMW was a TV station, which station would it be?

The next 10 years will be very exciting ones for the automotive industry.